

10 Jan 94

APPENDIX F

**SYSTEM SIMULATION
COMPUTER RUNS**

Volume II

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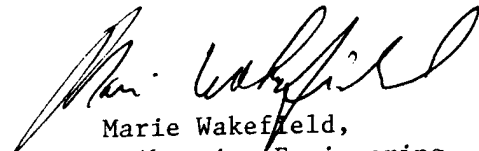


DEPARTMENT OF THE ARMY
CONSTRUCTION ENGINEERING RESEARCH LABORATORIES, CORPS OF ENGINEERS
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Marie Wakefield,
Librarian Engineering

Building 034
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DTIC QUALITY INSPECTED 2

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85	20/8/5/LIVING ROOM/189/1/1/0//10
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112	25/8/2/5.5/1.5/2/.81/.64
113	25/9/1/13.5/1/1/.81/.64
114	26/M/CBLQP/CBLQL/CBLQCLG//OFF/CBLQCLG/OFF/OFF/OFF/OFF
115	27/M/442/SF-PERS/230/190/.5/WATT-SF/INCAND
116	29/1/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF

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LINE #	-----
117	29/2/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF
118	29/3////////.23/CFM-SF
119	29/4////////.23/CFM-SF
120	29/5/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF
121	29/6////////.23/CFM-SF
122	29/7/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF
123	29/8/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF
124	29/9////////.23/CFM-SF
125	SYSTEM - 2
126	39/2/WEATHERSTRIP & CAULKING
127	40/1/PTAC
128	41/1/1/1/3/3/5/5
129	42/1/.25
130	45/1/CBLQCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
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135	59/2/CARLISLE///WEATHERSTRIP & CAULKING
136	60/1/1/PKPLANT/1/1
137	62/1/EQ1161/3
138	65/1/1//2/2
139	67/1/EQ2102/1
140	69/1/EQ4003

Building 034

Trace Output File

933702

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*****  
*****  
**                                     **  
**          TRACE 600 ANALYSIS          **  
**                                     **  
**          by              **          **  
**                                     **  
*****  
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 34

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Relectance: 0.20
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 11:28: 8 1/10/94
Dataset Name: CB34 .TM

AIRFLOW - ALTERNATIVE 1
BASE BUILDING

----- S Y S T E M S U M M A R Y -----
(Design Airflow Quantities)

System Number	System Type	----- Main -----					Auxil. Supply Airflow (Cfm)	Room Exhaust Airflow (Cfm)
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)		
1	PTAC	99	986	986	1,264	376	0	0
2	RAD	0	0	0	0	388	0	0
Totals		99	986	986	1,264	764	0	0

CAPACITY - ALTERNATIVE 1
BASE BUILDING

----- S Y S T E M S U M M A R Y -----
(Design Capacity Quantities)

		----- Cooling -----				----- Heating -----						
		Main Sys.	Aux. Sys.	Opt. Vent	Cooling	Main Sys.	Aux. Sys.	Preheat	Reheat	Humidif.	Opt. Vent	Heating
System	System	Capacity	Capacity	Capacity	Totals	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity	Totals
Number	Type	(Tons)	(Tons)	(Tons)	(Tons)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)
1	PTAC	2.2	0.0	0.0	2.2	-30,553	0	0	0	0	0	-30,553
2	RAD	0.0	0.0	0.0	0.0	-42,933	0	0	0	0	0	-42,933
Totals		2.2	0.0	0.0	2.2	-73,485	0	0	0	0	0	-73,485

The building peaked at hour 16 month 7 with a capacity of 2.2 tons

ENGINEERING CHECKS - ALTERNATIVE 1
BASE BUILDING

----- E N G I N E E R I N G C H E C K S -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	----- Cooling -----				----- Heating -----		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	PTAC	10.00	1.12	449.1	399.3	30.05	1.12	-34.84	877
2	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-32.40	1,325

System 1 Peak PTAC - PACKAGED TERMINAL AIR COND.

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/16 * Mo/Hr: 7/17 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 * OADB: 89 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Solar	5,165	0		5,165	19.60	*	6,791	39.11	*	0	0	0.00
Glass Cond	1,147	0		1,147	4.35	*	885	5.10	*	-5,483	-5,483	17.95
Wall Cond	3,986	0		3,986	15.12	*	4,702	27.08	*	-5,764	-5,764	18.87
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	10,279			10,279	39.00	*	3,655	21.05	*	-19,306	-19,306	63.19
Sub Total==>	20,578	0		20,578	78.07	*	16,032	92.33	*	-30,553	-30,553	100.00
Internal Loads												
Lights	1,193	0		1,193	4.53	*	1,004	5.78	*	0	0	0.00
People	744			744	2.82	*	327	1.88	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	1,937	0	0	1,937	7.35	*	1,331	7.67	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	3,632	13.78	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				210	0.80	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	22,514	0	0	26,357	100.00	*	17,363	100.00	*	-30,553	-30,553	100.00

-----COOLING COIL SELECTION-----

-----AREAS-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	2.2	26.4	18.3	986 76.6 63.7 70.0	58.7 54.8 59.5	877		
Aux Clg	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	Part	0	
Opt Vent	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	Exflr	0	
Totals	2.2	26.4				Roof	0	0
						Wall	990	102 10

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	10.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F				Clg Cfm/Sqft	1.12	SADB	58.8	96.5
Main Htg	-30.6	986	68.0	96.5	Infil	277	277	Clg Cfm/Ton	449.12	Plenum	75.0	68.0
Aux Htg	0.0	0	0.0	0.0	Supply	986	986	Clg Sqft/Ton	399.29	Return	75.0	68.0
Preheat	-0.0	986	62.4	58.6	Mincfm	0	0	Clg Btuh/Sqft	30.05	Ret/OA	76.5	68.0
Reheat	0.0	0	0.0	0.0	Return	986	986	No. People	2	Runarnd	75.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	99	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	1.12	Fn BldTD	0.0	0.0
Total	-30.6				Auxil	0	0	Htg Btuh/Sqft	-34.84	Fn Frict	0.1	0.0

System 2 Block RAD - RADIATION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Percnt		Space	Percnt		Space Peak	Coil Peak	Percnt
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	-192	-192	0.45
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-7,639	-7,639	17.79
Wall Cond	0	0		0	0.00	*	0	0.00	*	-8,074	-8,074	18.81
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-27,028	-27,028	62.95
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-42,933	-42,933	100.00
Internal Loads												
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0			0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-42,933	-42,933	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			AREAS		
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Gross Total	Glass (sf) (%)
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Floor	1,325
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0
Totals	0.0	0.0		0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	41 0 0
											Wall	1,386 142 10

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	--ENGINEERING CHECKS--			--TEMPERATURES (F)--		
	(Mbh)	(cfm)	Deg F	Deg F				Clg % OA			Type	Clg	Htg
Main Htg	-42.9	0	0.0	0.0	Vent	0	0	Clg Cfm/Sqft	0.00		SADB	-0.0	68.1
Aux Htg	0.0	0	0.0	0.0	Infil	0	388	Clg Cfm/Ton	0.00		Plenum	0.0	68.0
Preheat	0.0	0	0.0	0.0	Supply	0	0	Clg Sqft/Ton	0.00		Return	0.0	68.0
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00		Ret/OA	0.0	68.0
Humidif	0.0	0	0.0	0.0	Return	0	0	No. People	0		Runarnd	0.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0		Fn MtrTD	0.0	0.0
Total	-42.9				Rm Exh	0	0	Htg Cfm/SqFt	0.00		Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/SqFt	-32.40		Fn Frict	0.0	0.0

BUILDING U-VALUES - ALTERNATIVE 1
BASE BUILDING

----- B U I L D I N G U - V A L U E S -----

Room Number	Description	Room U-Values (Btu/hr/sqft/F)									Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
		Part.	ExFlr	Skylt	Wintr Skylt	Summr Roof	Wintr Windo	Summr Windo	Wall	Ceil.		
1	DEN	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	11.5	4.92
2	UTILITY ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	13.3	5.31
Zone 1	Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	12.3	5.09
5	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	8.3	4.19
Zone 3	Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	8.3	4.19
7	BEDROOM NO. 1	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	10.5	4.69
8	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	11.5	4.90
Zone 5	Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	11.0	4.80
System 1	Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	10.8	4.75
1	DEN	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	11.5	4.92
2	UTILITY ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	13.3	5.31
Zone 1	Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	12.3	5.09
3	BEDROOM NO. 2	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	10.0	4.56
4	KITCHEN	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	8.7	4.28
Zone 2	Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	9.3	4.41
5	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	8.3	4.19
Zone 3	Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	8.3	4.19
6	BATH	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	10.1	4.59
Zone 4	Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	10.1	4.59
7	BEDROOM NO. 1	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	10.5	4.69
8	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	11.5	4.90
Zone 5	Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	11.0	4.80
9	VEST & CLOSET	0.000	0.000	0.000	0.000	0.073	0.810	0.837	0.101	0.000	19.5	6.88
Zone 6	Total/Ave.	0.000	0.000	0.000	0.000	0.073	0.810	0.837	0.101	0.000	19.5	6.88
System 2	Total/Ave.	0.000	0.000	0.000	0.000	0.073	0.810	0.837	0.101	0.000	10.6	4.72
Building		0.000	0.000	0.000	0.000	0.073	0.810	0.837	0.101	0.000	10.7	4.73

BUILDING AREAS - ALTERNATIVE 1
BASE BUILDING

----- B U I L D I N G A R E A S -----

Room Number	Description	Number of Duplicate		Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	DEN	1	1	165	165	0	0	0	0	0	27	12	193
2	UTILITY ROOM	1	1	125	125	0	0	0	0	0	9	4	193
Zone	1 Total/Ave.				290	0	0	0	0	0	36	9	387
5	DINING ROOM	1	1	204	204	0	0	0	0	0	25	20	97
Zone	3 Total/Ave.				204	0	0	0	0	0	25	20	97
7	BEDROOM NO. 1	1	1	194	194	0	0	0	0	0	12	6	186
8	LIVING ROOM	1	1	189	189	0	0	0	0	0	29	12	219
Zone	5 Total/Ave.				383	0	0	0	0	0	41	9	404
System	1 Total/Ave.				877	0	0	0	0	0	102	10	888
1	DEN	1	1	165	165	0	0	0	0	0	27	12	193
2	UTILITY ROOM	1	1	125	125	0	0	0	0	0	9	4	193
Zone	1 Total/Ave.				290	0	0	0	0	0	36	9	387
3	BEDROOM NO. 2	1	1	170	170	0	0	0	0	0	12	8	141
4	KITCHEN	1	1	187	187	0	0	0	0	0	8	7	105
Zone	2 Total/Ave.				357	0	0	0	0	0	20	8	246
5	DINING ROOM	1	1	204	204	0	0	0	0	0	25	20	97
Zone	3 Total/Ave.				204	0	0	0	0	0	25	20	97
6	BATH	1	1	50	50	0	0	0	0	0	7	14	43
Zone	4 Total/Ave.				50	0	0	0	0	0	7	14	43
7	BEDROOM NO. 1	1	1	194	194	0	0	0	0	0	12	6	186
8	LIVING ROOM	1	1	189	189	0	0	0	0	0	29	12	219
Zone	5 Total/Ave.				383	0	0	0	0	0	41	9	404
9	VEST & CLOSET	1	1	41	41	0	0	0	0	41	14	17	68
Zone	6 Total/Ave.				41	0	0	0	0	41	14	17	68
System	2 Total/Ave.				1,325	0	0	0	0	41	142	10	1,244
Building					2,202	0	0	0	0	41	245	10	2,131

ASHRAE 90 ANALYSIS - ALTERNATIVE 1
BASE BUILDING

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.073 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.174 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.173 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 5.54 (Btu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTVw) = 14.04 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1
BASE BUILDING

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.1	25	316	-3,674	14	670	49.3	0	0	0.0	0	0
5 - 10	0.2	11	141	-7,349	13	634	98.6	0	0	0.0	0	0
10 - 15	0.3	7	92	-11,023	16	804	148.0	0	0	0.0	0	0
15 - 20	0.4	8	101	-14,697	20	964	197.3	42	1,530	0.0	0	0
20 - 25	0.5	4	56	-18,371	18	875	246.6	0	0	0.0	0	0
25 - 30	0.7	10	120	-22,046	12	606	295.9	0	0	0.0	0	0
30 - 35	0.8	3	42	-25,720	7	338	345.3	0	0	0.0	0	0
35 - 40	0.9	7	88	-29,394	0	0	394.6	0	0	0.0	0	0
40 - 45	1.0	8	103	-33,068	0	0	443.9	0	0	0.0	0	0
45 - 50	1.1	5	65	-36,743	0	0	493.2	21	765	0.0	0	0
50 - 55	1.2	3	42	-40,417	0	0	542.5	0	0	0.0	0	0
55 - 60	1.3	4	51	-44,091	0	0	591.9	0	0	0.0	0	0
60 - 65	1.4	0	0	-47,766	0	0	641.2	0	0	0.0	0	0
65 - 70	1.5	0	0	-51,440	0	0	690.5	0	0	0.0	0	0
70 - 75	1.6	0	0	-55,114	0	0	739.8	0	0	0.0	0	0
75 - 80	1.8	2	20	-58,788	0	0	789.2	0	0	0.0	0	0
80 - 85	1.9	1	11	-62,463	0	0	838.5	0	0	0.0	0	0
85 - 90	2.0	0	0	-66,137	0	0	887.8	0	0	0.0	0	0
90 - 95	2.1	0	0	-69,811	0	0	937.1	0	0	0.0	0	0
95 - 100	2.2	0	0	-73,485	0	0	986.4	38	1,377	0.0	0	0
Hours Off	0.0	0	7,512	0	0	3,869	0.0	0	5,088	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1
 BASE BUILDING

----- B U I L D I N G T E M P E R A T U R E P R O F I L E S -----

Temperature Range (F)	1	3	5	1	2	3	4	5	6	Zone Number
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Max. Temp.	81.9	79.0	83.1	105.4	105.8	107.5	110.1	102.6	104.1	
Mo./Hr.	7 14	7 14	7 14	8 20	8 21	7 22	8 18	7 21	7 19	
Day Type	1	1	1	1	1	1	1	1	1	

	Number of Hours									
Above 100	0	0	0	256	1,206	1,030	1,500	120	0	
95 - 100	0	0	0	1,117	1,249	950	1,040	919	208	
90 - 95	0	0	0	1,107	387	493	644	1,057	687	
85 - 90	0	0	0	722	402	706	398	733	922	
80 - 85	0	0	0	470	428	493	90	808	796	
75 - 80	2,174	2,817	2,319	0	0	0	0	35	704	
70 - 75	1,009	855	1,002	217	51	109	304	0	300	
65 - 70	765	102	351	4,871	5,037	4,979	4,784	5,088	5,143	
60 - 65	616	911	528	0	0	0	0	0	0	
55 - 60	890	563	889	0	0	0	0	0	0	
50 - 55	699	769	623	0	0	0	0	0	0	
Below 50	2,607	2,743	3,048	0	0	0	0	0	0	

Min. Temp.	31.4	32.8	30.8	67.9	68.0	67.9	68.0	67.9	67.3	
Mo./Hr.	2 9	2 11	2 9	1 3	1 1	4 2	1 1	4 12	5 5	
Day Type	4	5	4	2	1	3	1	2	1	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1
BASE BUILDING

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	HOT WTR On Peak (Therm)	HOT W DMND On Peak (Thrm/hr)
Jan	292	1	134	0
Feb	264	1	135	0
March	299	1	88	0
April	281	1	39	0
May	381	4	0	0
June	622	5	0	0
July	899	5	0	0
Aug	630	5	0	0
Sept	384	4	0	0
Oct	295	1	27	0
Nov	281	1	60	0
Dec	288	1	110	0
Total	4,917	5	592	0

Building Energy Consumption = 34,528 (Btu/Sq Ft/Year)
Source Energy Consumption = 58,742 (Btu/Sq Ft/Year)

Floor Area = 2,202 (Sq Ft)

----- EQUIPMENT ENERGY CONSUMPTION -----

Ref Num	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS ELEC PK	291 1.1	263 1.1	299 1.1	281 1.1	295 1.1	288 1.1	288 1.1	299 1.1	281 1.1	295 1.1	281 1.1	288 1.1	3,447 1.1
1	MISC LD ELEC PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
2	MISC LD GAS PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
3	MISC LD OIL PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
4	MISC LD P STEAM PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
5	MISC LD P HOTH2O PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
6	MISC LD P CHILL PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
1	EQ1161 ELEC PK	AIR-CLD COND COMP <15 TONS												
		0	0	0	0	13	183	397	185	17	0	0	0	794
		0.0	0.0	0.0	0.0	2.8	2.9	3.0	3.0	2.8	0.0	0.0	0.0	3.0
1	EQ5200 ELEC PK	CONDENSER FANS												
		0	0	0	0	1	19	40	19	2	0	0	0	81
		0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.3	0.1	0.0	0.0	0.0	0.3
1	EQ5303 ELEC PK	CONTROLS												
		0	0	0	0	19	81	121	74	33	0	0	0	328
		0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
1	EQ4003 ELEC PK	FC CENTRIF. FAN C.V.												
		0	0	0	0	53	51	53	53	51	0	0	0	262
		0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1
1	EQ2102 P HOTH2O PK	PURCHASED DIST. HOT WATER												
		134	135	88	39	0	0	0	0	0	27	60	110	592
		0.3	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.3
1	EQ5020	HEAT WATER CIRC. PUMP C.V.												

Trane Air Conditioning Economics
By: Trane Customer Direct Service Network

V 600
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EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1
BASE BUILDING[illegible]

UTILITY PEAK CHECKSUMS - ALTERNATIVE 1
BASE BUILDING

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 4.8 (kW)
Yearly Time of Peak 16 (hr) 7 (mo)

Hour 16 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Percnt Of Tot (%)
----------------------	------------------------	-----------------------	---------------------------	-------------------------

Cooling Equipment

1	EQ1161	AIR-CLD COND COMP <15 TONS	3.6	74.63
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Sub Total			3.6	74.63
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Sub Total			0.0	0.00
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Air Moving Equipment

1		SUMMATION OF FAN ELECTRICAL DEMAND	0.1	2.62
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Sub Total			0.1	2.62
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Sub Total			0.0	0.00
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Miscellaneous

Lights			1.1	22.75
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Base Utilities			0.0	0.00
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Misc Equipment			0.0	0.00
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Sub Total			1.1	22.75
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Grand Total			4.8	100.00
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**                                     **
**          TRACE    600    ANALYSIS          **
**                                     **
**          by          **                                     **
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 34

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Reflectance: 0.20
Winter Ground Reflectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 11:42:18 1/10/94
Dataset Name: CB34 .TM

AIRFLOW - ALTERNATIVE 2
WEATHERSTRIP & CAULKING

----- S Y S T E M S U M M A R Y -----
(Design Airflow Quantities)

System Number	System Type	----- Main -----					Auxil. Supply Airflow (Cfm)	Room Exhaust Airflow (Cfm)
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)		
1	PTAC	95	954	954	1,181	323	0	0
2	RAD	0	0	0	0	319	0	0
Totals		95	954	954	1,181	642	0	0

CAPACITY - ALTERNATIVE 2
WEATHERSTRIP & CAULKING

----- S Y S T E M S U M M A R Y -----
(Design Capacity Quantities)

System Number	System Type	----- Cooling -----					----- Heating -----					
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	PTAC	2.0	0.0	0.0	2.0	-27,105	0	0	0	0	0	-27,105
2	RAD	0.0	0.0	0.0	0.0	-38,106	0	0	0	0	0	-38,106
Totals		2.0	0.0	0.0	2.0	-65,212	0	0	0	0	0	-65,212

The building peaked at hour 16 month 7 with a capacity of 2.0 tons

ENGINEERING CHECKS - ALTERNATIVE 2
WEATHERSTRIP & CAULKING

----- E N G I N E E R I N G C H E C K S -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	----- Cooling -----				--- Heating ---		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	PTAC	10.00	1.09	466.1	428.6	28.00	1.09	-30.91	877
2	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-28.76	1,325

System 1 Peak PTAC - PACKAGED TERMINAL AIR COND.

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/16 * Mo/Hr: 7/17 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 * OADB: 89 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Solar	5,165	0		5,165	21.04	*	6,791	40.64	*	0	0	0.00
Glass Cond	1,147	0		1,147	4.67	*	885	5.29	*	-5,483	-5,483	20.23
Wall Cond	3,986	0		3,986	16.23	*	4,702	28.14	*	-5,764	-5,764	21.27
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	8,571			8,571	34.91	*	3,002	17.97	*	-15,858	-15,858	58.51
Sub Total==>	18,870	0		18,870	76.86	*	15,379	92.03	*	-27,105	-27,105	100.00
Internal Loads												
Lights	1,193	0		1,193	4.86	*	1,004	6.01	*	0	0	0.00
People	744			744	3.03	*	327	1.96	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	1,937	0	0	1,937	7.89	*	1,331	7.97	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	3,542	14.43	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				203	0.83	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	20,807	0	0	24,552	100.00	*	16,710	100.00	*	-27,105	-27,105	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			AREAS		
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Gross Total	Glass (sf) (%)
Main Clg	2.0	24.6	17.4	954	76.6	63.6	69.4	58.8	55.0	60.2	Floor	877
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0
Totals	2.0	24.6									Roof	0
											Wall	990
												102 10

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	--ENGINEERING CHECKS--			--TEMPERATURES (F)--		
	(Mbh)	(cfm)	Deg F	Deg F				Clg % OA			Type	Clg	Htg
Main Htg	-27.1	954	68.0	94.1	Vent	95	0	Clg Cfm/Sqft	1.09		SADB	58.9	94.1
Aux Htg	0.0	0	0.0	0.0	Infil	228	228	Clg Cfm/Ton	466.13		Plenum	75.0	68.0
Preheat	-0.0	954	62.3	58.7	Supply	954	954	Clg Sqft/Ton	428.64		Return	75.0	68.0
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	28.00		Ret/OA	76.5	68.0
Humidif	0.0	0	0.0	0.0	Return	954	954	No. People	2		Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	95	0	Htg % OA	0.0		Fn MtrTD	0.0	0.0
Total	-27.1				Rm Exh	0	0	Htg Cfm/Sqft	1.09		Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/Sqft	-30.91		Fn Frict	0.1	0.0

System 2 Block RAD - RADIATION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	-192	-192	0.50
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-7,639	-7,639	20.05
Wall Cond	0	0		0	0.00	*	0	0.00	*	-8,074	-8,074	21.19
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-22,202	-22,202	58.26
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-38,106	-38,106	100.00
Internal Loads												
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkwd		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-38,106	-38,106	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total Floor	AREAS Glass (sf) (%)
Main Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	1,325	
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0	
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0	
Totals	0.0	0.0				41	0 0
						1,386	142 10

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
Main Htg	-38.1	0	0.0	0.0	Vent	0	0	Clg Cfm/Sqft	0.00	SADB	0.0	68.1
Aux Htg	0.0	0	0.0	0.0	Infil	0	319	Clg Cfm/Ton	0.00	Plenum	0.0	68.0
Preheat	0.0	0	0.0	0.0	Supply	0	0	Clg Sqft/Ton	0.00	Return	0.0	68.0
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	68.0
Humidif	0.0	0	0.0	0.0	Return	0	0	No. People	0	Runarnd	0.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-38.1				Rm Exh	0	0	Htg Cfm/SqFt	0.00	Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/SqFt	-28.76	Fn Frict	0.0	0.0

BUILDING U-VALUES - ALTERNATIVE 2
WEATHERSTRIP & CAULKING

----- B U I L D I N G U - V A L U E S -----

Room Number	Description	Part.	ExFlr	Room U-Values (Btu/hr/sqft/F)							Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
				Summr Skylt	Wintr Skylt	Roof	Summr Windo	Wintr Windo	Wall	Ceil.		
1	DEN	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	11.5	4.92
2	UTILITY ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	13.3	5.31
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	12.3	5.09
5	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	8.3	4.19
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	8.3	4.19
7	BEDROOM NO. 1	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	10.5	4.69
8	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	11.5	4.90
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	11.0	4.80
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	10.8	4.75
1	DEN	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	11.5	4.92
2	UTILITY ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	13.3	5.31
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	12.3	5.09
3	BEDROOM NO. 2	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	10.0	4.56
4	KITCHEN	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	8.7	4.28
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	9.3	4.41
5	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	8.3	4.19
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	8.3	4.19
6	BATH	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	10.1	4.59
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	10.1	4.59
7	BEDROOM NO. 1	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	10.5	4.69
8	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	11.5	4.90
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.101	0.000	11.0	4.80
9	VEST & CLOSET	0.000	0.000	0.000	0.000	0.073	0.810	0.837	0.101	0.000	19.5	6.88
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.073	0.810	0.837	0.101	0.000	19.5	6.88
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.073	0.810	0.837	0.101	0.000	10.6	4.72
Building		0.000	0.000	0.000	0.000	0.073	0.810	0.837	0.101	0.000	10.7	4.73

BUILDING AREAS - ALTERNATIVE 2
WEATHERSTRIP & CAULKING

----- B U I L D I N G A R E A S -----													
Room Number	Description	Number of Duplicate		Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	DEN	1	1	165	165	0	0	0	0	0	27	12	193
2	UTILITY ROOM	1	1	125	125	0	0	0	0	0	9	4	193
Zone	1 Total/Ave.				290	0	0	0	0	0	36	9	387
5	DINING ROOM	1	1	204	204	0	0	0	0	0	25	20	97
Zone	3 Total/Ave.				204	0	0	0	0	0	25	20	97
7	BEDROOM NO. 1	1	1	194	194	0	0	0	0	0	12	6	186
8	LIVING ROOM	1	1	189	189	0	0	0	0	0	29	12	219
Zone	5 Total/Ave.				383	0	0	0	0	0	41	9	404
System	1 Total/Ave.				877	0	0	0	0	0	102	10	888
1	DEN	1	1	165	165	0	0	0	0	0	27	12	193
2	UTILITY ROOM	1	1	125	125	0	0	0	0	0	9	4	193
Zone	1 Total/Ave.				290	0	0	0	0	0	36	9	387
3	BEDROOM NO. 2	1	1	170	170	0	0	0	0	0	12	8	141
4	KITCHEN	1	1	187	187	0	0	0	0	0	8	7	105
Zone	2 Total/Ave.				357	0	0	0	0	0	20	8	246
5	DINING ROOM	1	1	204	204	0	0	0	0	0	25	20	97
Zone	3 Total/Ave.				204	0	0	0	0	0	25	20	97
6	BATH	1	1	50	50	0	0	0	0	0	7	14	43
Zone	4 Total/Ave.				50	0	0	0	0	0	7	14	43
7	BEDROOM NO. 1	1	1	194	194	0	0	0	0	0	12	6	186
8	LIVING ROOM	1	1	189	189	0	0	0	0	0	29	12	219
Zone	5 Total/Ave.				383	0	0	0	0	0	41	9	404
9	VEST & CLOSET	1	1	41	41	0	0	0	0	41	14	17	68
Zone	6 Total/Ave.				41	0	0	0	0	41	14	17	68
System	2 Total/Ave.				1,325	0	0	0	0	41	142	10	1,244
Building					2,202	0	0	0	0	41	245	10	2,131

ASHRAE 90 ANALYSIS - ALTERNATIVE 2
WEATHERSTRIP & CAULKING

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.073 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.174 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.173 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 5.54 (Btu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTVw) = 14.04 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2
WEATHERSTRIP & CAULKING

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----				---- Cooling Airflow ----				---- Heating Airflow ----			
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours		Cap. (Cfm)	Hours (%)	Hours		Cap. (Cfm)	Hours (%)	Hours	
0 - 5	0.1	22	289	-3,261	15	738		47.7	0	0		0.0	0	0	
5 - 10	0.2	15	207	-6,521	13	618		95.4	0	0		0.0	0	0	
10 - 15	0.3	11	142	-9,782	15	747		143.1	0	0		0.0	0	0	
15 - 20	0.4	3	39	-13,042	21	1,000		190.7	42	1,530		0.0	0	0	
20 - 25	0.5	7	91	-16,303	17	814		238.4	0	0		0.0	0	0	
25 - 30	0.6	9	117	-19,563	12	588		286.1	0	0		0.0	0	0	
30 - 35	0.7	5	64	-22,824	7	338		333.8	0	0		0.0	0	0	
35 - 40	0.8	3	44	-26,085	0	0		381.5	0	0		0.0	0	0	
40 - 45	0.9	9	122	-29,345	0	0		429.2	0	0		0.0	0	0	
45 - 50	1.0	7	98	-32,606	0	0		476.9	21	765		0.0	0	0	
50 - 55	1.1	1	11	-35,866	0	0		524.5	0	0		0.0	0	0	
55 - 60	1.2	3	42	-39,127	0	0		572.2	0	0		0.0	0	0	
60 - 65	1.3	3	40	-42,388	0	0		619.9	0	0		0.0	0	0	
65 - 70	1.4	0	0	-45,648	0	0		667.6	0	0		0.0	0	0	
70 - 75	1.5	0	0	-48,909	0	0		715.3	0	0		0.0	0	0	
75 - 80	1.6	1	20	-52,169	0	0		763.0	0	0		0.0	0	0	
80 - 85	1.7	1	11	-55,430	0	0		810.7	0	0		0.0	0	0	
85 - 90	1.8	0	0	-58,690	0	0		858.3	0	0		0.0	0	0	
90 - 95	1.9	0	0	-61,951	0	0		906.0	0	0		0.0	0	0	
95 - 100	2.0	0	0	-65,212	0	0		953.7	38	1,377		0.0	0	0	
Hours Off	0.0	0	7,423	0	0	3,917		0.0	0	5,088		0.0	0	8,760	

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2
WEATHERSTRIP & CAULKING

----- B U I L D I N G T E M P E R A T U R E P R O F I L E S -----

Temperature Range (F)	Zone Number									
	1	3	5	1	2	3	4	5	6	

Max. Temp.	81.7	78.9	83.1	105.4	105.8	107.5	110.1	102.6	104.1	
Mo./Hr.	7 14	7 14	7 14	8 20	8 21	7 22	8 18	7 21	7 19	
Day Type	1	1	1	1	1	1	1	1	1	

	Number of Hours									
Above 100	0	0	0	256	1,206	1,030	1,500	120	0	
95 - 100	0	0	0	1,117	1,249	950	1,040	919	208	
90 - 95	0	0	0	1,107	387	493	644	1,057	687	
85 - 90	0	0	0	722	402	728	398	733	922	
80 - 85	0	0	0	470	428	471	90	808	796	
75 - 80	2,330	2,953	2,457	0	0	0	0	35	704	
70 - 75	895	719	1,069	276	102	162	416	0	300	
65 - 70	800	221	163	4,812	4,986	4,926	4,672	5,088	5,143	
60 - 65	741	927	674	0	0	0	0	0	0	
55 - 60	792	527	816	0	0	0	0	0	0	
50 - 55	662	755	686	0	0	0	0	0	0	
Below 50	2,540	2,658	2,895	0	0	0	0	0	0	

Min. Temp.	32.5	33.5	31.5	67.9	67.9	67.9	67.9	67.9	67.3	
Mo./Hr.	2 9	2 11	2 9	1 6	2 15	1 7	3 6	3 17	5 5	
Day Type	4	4	4	2	2	2	3	2	1	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2
WEATHERSTRIP & CAULKING

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	HOT, WTR	HOT W DMND
	Off Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	292	1	118	0
Feb	264	1	118	0
March	299	1	76	0
April	281	1	31	0
May	397	4	0	0
June	625	4	0	0
July	892	5	0	0
Aug	631	4	0	0
Sept	384	4	0	0
Oct	295	1	22	0
Nov	281	1	52	0
Dec	288	1	98	0
Total	4,930	5	515	0

Building Energy Consumption = 31,015 (Btu/Sq Ft/Year)
Source Energy Consumption = 54,092 (Btu/Sq Ft/Year)

Floor Area = 2,202 (Sq Ft)

----- EQUIPMENT ENERGY CONSUMPTION -----

[illegible]

V 600
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UTILITY PEAK CHECKSUMS - ALTERNATIVE 2
WEATHERSTRIP & CAULKING

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 4.6 (kW)
Yearly Time of Peak 16 (hr) 7 (mo)

Hour 16 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Perct Of Tot (%)
----------------------	------------------------	-----------------------	---------------------------	------------------------

Cooling Equipment

1	EQ1161	AIR-CLD COND COMP <15 TONS	3.4	73.44
Sub Total			3.4	73.44
Sub Total			0.0	0.00

Air Moving Equipment

1		SUMMATION OF FAN ELECTRICAL DEMAND	0.1	2.66
Sub Total			0.1	2.66
Sub Total			0.0	0.00

Miscellaneous

	Lights		1.1	23.90
	Base Utilities		0.0	0.00
	Misc Equipment		0.0	0.00
Sub Total			1.1	23.90
Grand Total			4.6	100.00

Building 040
Trace Input File

933702

CONTENTS OF : E:\CB40.TM

LINE # -----

1 JOB - 1

2 01/ENERGY SAVINGS OPPORTUNITY STUDY

3 01/CARLISLE BARRACKS, PA

4 01/DEPARTMENT OF THE ARMY

5 01/BENATEC ASSOCIATES

6 01/BUILDING 40

7 08/CARLISLE

8 09/MAY/SEP////APR/OCT

9 10/CLTD-CLF

10 11///ZONE

11 LOAD - 1

12 19/1/BASE BUILDING

13 20/1/1/1ST FL APT'S/3791/1/3/.9/.45

14 20/2/2/2ND FL APT'S/4046/1/1/0

15 20/3/3/LAUNDRY ROOM/88/1/3/.9/.45

16 20/4/4/MECH ROOM/167/1/3/0

17 21/1////CBLQTX///CBLQTX

18 21/2////CBLQTX///CBLQTX

19 21/3////CBLQTX///CBLQTX

20 21/4////CBLQTX///CBLQTX

21 22/2/1/YES////151

22 22/4/1/YES////152

23 24/1/1/34/8//153/30

24 24/1/2/112/8//153/120

25 24/1/3/112/8//153/300

26 24/2/1/34/8.5//153/30

27 24/2/2/119/8.5//153/120

28 24/2/3/34/8.5//153/210

29 24/2/4/119/8.5//153/300

30 24/3/1/7/8//153/120

31 24/3/2/11/8//153/210

32 24/4/1/14/7.4//141/120

33 24/4/2/11/7.7//141/210

34 24/4/3/14/7.8//141/300

35 25/1/1/4.3/2.3/2/.7/.64

36 25/1/2/4.3/2.3/16/.7/.64

37 25/1/3/4.3/2.3/16/.7/.64

38 25/2/1/4.3/2.3/2/.7/.64

39 25/2/2/4.3/2.3/20/.7/.64

40 25/2/3/4.3/2.3/2/.7/.64

41 25/2/4/4.3/2.3/20/.7/.64

42 25/3/2/2.7/1.3/1/1.04/1

43 25/4/3/2.75/1.5/2/1.04/1

44 26/1/CBLQP/CBLQL/CBLQP//OFF/CBLQFAN/OFF/OFF/OFF/OFF

45 26/2/CBLQP/CBLQL/CBLQP//OFF/CBLQFAN/OFF/OFF/OFF/OFF

46 26/3/CBLQP/CBLQL/OFF//OFF/OFF/OFF/OFF/OFF/OFF

47 26/4/OFF/OFF/OFF//OFF/HTGONLY/HTGONLY/OFF/OFF/OFF

48 27/1/10/PEOPLE/230/190/.5/WATT-SF/INCAND

49 27/2/10/PEOPLE/230/190/.5/WATT-SF/INCAND

50 27/3/1/PEOPLE/315/325/1.5/WATT-SF

51 29/1/15/PCT-MCLG/15/PCT-MHTG/.33/CFM-SF/.33/CFM-SF

52 29/2/15/PCT-MCLG/15/PCT-MHTG/.33/CFM-SF/.33/CFM-SF

53 29/3////////.33/CFM-SF

54 29/4////////.33/CFM-SF

55 30/1/1.5/CFM-SF/1.5/CFM-SF

56 30/2/1.5/CFM-SF/1.5/CFM-SF

57 30/4/1.5/CFM-SF

58 SYSTEM - 1

CONTENTS OF : E:\CB40.TM

LINE #	-----
59	39/1/BASE BUILDING
60	40/1/FC
61	41/1/1/2
62	42/1/.25/.25
63	45/1/CBLQCLG/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF
64	40/2/RAD
65	41/2/3/3
66	42/2
67	45/2/OFF/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF
68	40/3/UH
69	41/3/4/4
70	42/3/.20
71	45/3/HTGONLY/OFF/OFF/OFF/OFF/HTGONLY/OFF/OFF/OFF/OFF
72	EQUIPMENT - 1
73	59/1/CARLISLE///BASE BUILDING
74	60/1/1/PKPLANT/1/1
75	62/1/EQ1161/36/7.267/MBH
76	65/1/1//1/3
77	67/1/EQ2102/1
78	69/1/EQ4371
79	69/3
80	LOAD - 2
81	19/2/WALL & ROOF INSULATION
82	20/1/1/1ST FL APT'S/3791/1/3/.9/.45
83	20/2/2/2ND FL APT'S/4046/1/1/0
84	20/3/3/LAUNDRY ROOM/88/1/3/.9/.45
85	20/4/4/MECH ROOM/167/1/3/0
86	21/1////CBLQTX///CBLQTX
87	21/2////CBLQTX///CBLQTX
88	21/3////CBLQTX///CBLQTX
89	21/4////CBLQTX///CBLQTX
90	22/2/1/YES////144
91	22/4/1/YES////152
92	24/1/1/34/8//143/30
93	24/1/2/112/8//143/120
94	24/1/3/112/8//143/300
95	24/2/1/34/8.5//143/30
96	24/2/2/119/8.5//143/120
97	24/2/3/34/8.5//143/210
98	24/2/4/119/8.5//143/300
99	24/3/1/7/8//143/120
100	24/3/2/11/8//143/210
101	24/4/1/14/7.4//141/120
102	24/4/2/11/7.7//141/210
103	24/4/3/14/7.8//141/300
104	25/1/1/4.3/2.3/2/.7/.64
105	25/1/2/4.3/2.3/16/.7/.64
106	25/1/3/4.3/2.3/16/.7/.64
107	25/2/1/4.3/2.3/2/.7/.64
108	25/2/2/4.3/2.3/20/.7/.64
109	25/2/3/4.3/2.3/2/.7/.64
110	25/2/4/4.3/2.3/20/.7/.64
111	25/3/2/2.7/1.3/1/1.04/1
112	25/4/3/2.75/1.5/2/1.04/1
113	26/1/CBLQP/CBLQL/CBLQP//OFF/CBLQFAN/OFF/OFF/OFF/OFF
114	26/2/CBLQP/CBLQL/CBLQP//OFF/CBLQFAN/OFF/OFF/OFF/OFF
115	26/3/CBLQP/CBLQL/OFF//OFF/OFF/OFF/OFF/OFF/OFF
116	26/4/OFF/OFF/OFF//OFF/HTGONLY/HTGONLY/OFF/OFF/OFF

CONTENTS OF : E:\CB40.TM

LINE #	-----
117	27/1/10/PEOPLE/230/190/.5/WATT-SF/INCAND
118	27/2/10/PEOPLE/230/190/.5/WATT-SF/INCAND
119	27/3/1/PEOPLE/315/325/1.5/WATT-SF
120	29/1/15/PCT-MCLG/15/PCT-MHTG/.27/CFM-SF/.27/CFM-SF
121	29/2/15/PCT-MCLG/15/PCT-MHTG/.27/CFM-SF/.27/CFM-SF
122	29/3////////.27/CFM-SF
123	29/4////////.27/CFM-SF
124	30/1/1.5/CFM-SF/1.5/CFM-SF
125	30/2/1.5/CFM-SF/1.5/CFM-SF
126	30/4/1.5/CFM-SF
127	SYSTEM - 2
128	39/2/WALL & ROOF INSULATION
129	40/1/FC
130	41/1/1/2
131	42/1/.25/.25
132	45/1/CBLQCLG/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF
133	40/2/RAD
134	41/2/3/3
135	42/2
136	45/2/OFF/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF
137	40/3/UH
138	41/3/4/4
139	42/3/.20
140	45/3/HTGONLY/OFF/OFF/OFF/OFF/HTGONLY/OFF/OFF/OFF/OFF
141	EQUIPMENT - 2
142	59/2/CARLISLE///WALL & ROOF INSULATION
143	60/1/1/PKPLANT/1/1
144	62/1/EQ1161/36/7.267/MBH
145	65/1/1//1/3
146	67/1/EQ2102/1
147	69/1/EQ4371
148	69/3

Building 040

Trace Output File

933702


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*****  
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**  
**          TRACE 600 ANALYSIS          **  
**  
**          by          **  
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 40

Weather File Code:	CARLISLE
Location:	ENERGY SAVINGS OPPORTUNITY STUDY
Latitude:	40.2 (deg)
Longitude:	77.2 (deg)
Time Zone:	5
Elevation:	475 (ft)
Barometric Pressure:	29.2 (in. Hg)
Summer Clearness Number:	1.00
Winter Clearness Number:	1.00
Summer Design Dry Bulb:	92 (F)
Summer Design Wet Bulb:	72 (F)
Winter Design Dry Bulb:	4 (F)
Summer Ground Reflectance:	0.20
Winter Ground Reflectance:	0.20
Air Density:	0.0742 (Lbm/cuft)
Air Specific Heat:	0.2444 (Btu/lbm/F)
Density-Specific Heat Prod:	1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor:	4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor:	4.4519 (Lb-min./hr/cuft)
Design Simulation Period:	May To September
System Simulation Period:	January To December
Cooling Load Methodology:	CLTD/CLF (Transfer Function Method)
Time/Date Program was Run:	14:58:35 1/11/94
Dataset Name:	CB40 .TM

AIRFLOW - ALTERNATIVE 1
BASE BUILDING

----- S Y S T E M S U M M A R Y -----
(Design Airflow Quantities)

System Number	System Type	----- Main -----					Auxil. Supply	Room Exhaust
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Airflow (Cfm)	Airflow (Cfm)
1	FC	1,763	11,755	11,755	13,295	3,303	0	0
2	RAD	0	0	0	0	48	0	0
3	UH	0	0	268	0	98	0	0
Totals		1,763	11,755	12,023	13,295	3,448	0	0

CAPACITY - ALTERNATIVE 1
BASE BUILDING

----- S Y S T E M S U M M A R Y -----
(Design Capacity Quantities)

System Number	System Type	----- Cooling -----					----- Heating -----					
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	FC	16.1	0.0	0.0	16.1	-220,087	0	-87,105	0	0	0	-220,087
2	RAD	0.0	0.0	0.0	0.0	-5,535	0	0	0	0	0	-5,535
3	UH	0.0	0.0	0.0	0.0	-16,600	0	0	0	0	0	-16,600
Totals		16.1	0.0	0.0	16.1	-242,222	0	-87,105	0	0	0	-242,222

The building peaked at hour 16 month 7 with a capacity of 16.1 tons

ENGINEERING CHECKS - ALTERNATIVE 1
BASE BUILDING

----- E N G I N E E R I N G C H E C K S -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	----- Cooling -----				--- Heating ---		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	FC	15.00	1.50	731.2	487.5	24.62	1.50	-28.08	7,837
2	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-62.90	88
3	Main	UH	0.00	0.00	0.0	0.0	0.00	1.60	-99.40	167

System 1 Block FC - FAN COIL

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/16 * Mo/Hr: 7/17 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 * OADB: 89 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	18,445	0		18,445	9.56	*	18,021	13.98	*	-15,057	-15,057	7.07
Glass Solar	33,606	0		33,606	17.42	*	36,692	28.47	*	0	0	0.00
Glass Cond	7,482	0		7,482	3.88	*	7,128	5.53	*	-35,586	-35,586	16.71
Wall Cond	24,246	1,157		25,402	13.17	*	26,129	20.27	*	-52,571	-55,157	25.89
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	42,137			42,137	21.84	*	23,789	18.46	*	-107,216	-107,216	50.33
Sub Total==>	125,917	1,157		127,073	65.87	*	111,758	86.71	*	-210,430	-213,016	100.00
Internal Loads												
Lights	10,699	0		10,699	5.55	*	10,967	8.51	*	0	0	0.00
People	7,388			7,388	3.83	*	3,818	2.96	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	18,087	0	0	18,087	9.38	*	14,785	11.47	*	0	0	0.00
Ceiling Load	2,702	-2,702		0	0.00	*	2,341	1.82	*	-2,432	0	0.00
Outside Air	0	0	0	47,733	24.74	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				2,508	1.30	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Pkping	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		-2,489	0	-2,489	-1.29	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	-0.00	*		0.00	*		0	0.00
Grand Total==>	146,706	-4,035	0	192,912	100.00	*	128,884	100.00	*	-212,862	-213,016	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F Deg F Grains	Floor	7,837	
Main Clg	16.1	192.9	155.0	11,755	78.5 67.4 85.4	Part	0	
Aux Clg	0.0	0.0	0.0	0	0.0 0.0 0.0	ExFlr	0	
Opt Vent	0.0	0.0	0.0	0	0.0 0.0 0.0	Roof	4,046	0 0
Totals	16.1	192.9				Wall	4,665	771 17

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	15.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F								
Main Htg	-220.1	11,755	67.4	84.6	Vent	1,763	0	Clg Cfm/Sqft	1.50	SADB	64.9	84.6
Aux Htg	0.0	0	0.0	0.0	Infil	1,539	1,539	Clg Cfm/Ton	731.25	Plenum	76.3	66.8
Preheat	-87.1	11,755	57.9	64.7	Supply	11,755	11,755	Clg Sqft/Ton	487.50	Return	76.3	67.4
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	24.62	Ret/OA	78.4	67.4
Humidif	0.0	0	0.0	0.0	Return	11,755	11,755	No. People	20	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	1,763	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-220.1				Rm Exh	0	0	Htg Cfm/Sqft	1.50	Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/Sqft	-28.08	Fn Frict	0.1	0.1

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 2 Block RAD - RADIATION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-244	-244	4.41
Wall Cond	0	0		0	0.00	*	0	0.00	*	-1,808	-1,982	35.80
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-3,310	-3,310	59.79
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-5,362	-5,535	100.00
Internal Loads												
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	-173	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-5,535	-5,535	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F	Entering DB/WB/HR Deg F	Entering DB/WB/HR Grains	Leaving DB/WB/HR Deg F	Leaving DB/WB/HR Deg F	Leaving DB/WB/HR Grains	Gross Total	Glass (sf)	(%)
Main Clg	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Floor	88	
Aux Clg	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	0	
Opt Vent	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0	
Totals	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	0	0 0
										Wall	144	4 2

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
Main Htg	-5.5	0	0.0	0.0	Vent	0	0	Clg Cfm/Sqft	0.00	SADB	-0.0	68.1
Aux Htg	0.0	0	0.0	0.0	Infil	0	48	Clg Cfm/Ton	0.00	Plenum	0.0	64.4
Preheat	0.0	0	0.0	0.0	Supply	0	0	Clg Sqft/Ton	0.00	Return	0.0	64.4
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	64.4
Humidif	0.0	0	0.0	0.0	Return	0	0	No. People	0	Runarnd	0.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-5.5				Rm Exh	0	0	Htg Cfm/Sqft	0.00	Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/Sqft	-62.90	Fn Frict	0.0	0.0

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 3 Block UH - UNIT HEATERS

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	-4,428	-4,428	26.67
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-573	-573	3.45
Wall Cond	0	0		0	0.00	*	0	0.00	*	-4,762	-4,762	28.69
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-6,837	-6,837	41.19
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-16,600	-16,600	100.00
Internal Loads												
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0			0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-16,600	-16,600	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf) (%)	
	(Tons)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor		
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	Part	167	
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	ExFlr	0	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	Roof	167	0 0
Totals	0.0	0.0								Wall	297	8 3

-----AREAS-----

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	--ENGINEERING CHECKS--			--TEMPERATURES (F)--		
	(Mbh)	(cfm)	Deg F	Deg F	Vent			Clg % OA		Type	Clg	Htg	
Main Htg	-16.6	268	68.0	125.0	Infil	0	0	Clg Cfm/Sqft	0.00	SADB	0.0	125.0	
Aux Htg	0.0	0	0.0	0.0	Supply	0	268	Clg Cfm/Ton	0.00	Plenum	0.0	68.0	
Preheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Sqft/Ton	0.00	Return	0.0	68.0	
Reheat	0.0	0	0.0	0.0	Return	0	268	Clg Btuh/Sqft	0.00	Ret/OA	0.0	68.0	
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	No. People	0	Runarnd	0.0	68.0	
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0	
Total	-16.6				Auxil	0	0	Htg Cfm/Sqft	1.60	Fn BldTD	0.0	0.0	
								Htg Btuh/Sqft	-99.40	Fn Frict	0.1	0.0	

BUILDING U-VALUES - ALTERNATIVE 1
BASE BUILDING

----- B U I L D I N G U - V A L U E S -----

Room Number	Description	Part.	ExFlr	Room U-Values (Btu/hr/sqft/F)							Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
				Summr	Wintr	Summr	Wintr	Summr	Wintr	Wall		
				Skylt	Skylt	Roof	Windo	Windo		Ceil.		
1	1ST FL APT'S	0.000	0.000	0.000	0.000	0.000	0.700	0.720	0.222	0.549	41.5	8.77
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.700	0.720	0.222	0.549	41.5	8.77
2	2ND FL APT'S	0.000	0.000	0.000	0.000	0.058	0.700	0.720	0.222	0.000	40.3	12.01
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.058	0.700	0.720	0.222	0.000	40.3	12.01
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.058	0.700	0.720	0.222	0.549	40.9	10.44
3	LAUNDRY ROOM	0.000	0.000	0.000	0.000	0.000	1.040	1.086	0.222	0.549	95.3	20.71
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	1.040	1.086	0.222	0.549	95.3	20.71
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	1.040	1.086	0.222	0.549	95.3	20.71
4	MECH ROOM	0.000	0.000	0.000	0.000	0.414	1.040	1.086	0.257	0.000	123.1	27.06
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.414	1.040	1.086	0.257	0.000	123.1	27.06
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.414	1.040	1.086	0.257	0.000	123.1	27.06
Building		0.000	0.000	0.000	0.000	0.072	0.705	0.726	0.224	0.549	43.2	10.90

BUILDING AREAS - ALTERNATIVE 1
BASE BUILDING

----- B U I L D I N G A R E A S -----

Room Number	Description	Number of Duplicate		Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
		Flr	Rm										
1	1ST FL APT'S	1	1	3,791	3,791	0	0	0	0	0	336	16	1,728
Zone	1 Total/Ave.				3,791	0	0	0	0	0	336	16	1,728
2	2ND FL APT'S	1	1	4,046	4,046	0	0	0	0	4,046	435	17	2,166
Zone	2 Total/Ave.				4,046	0	0	0	0	4,046	435	17	2,166
System	1 Total/Ave.				7,837	0	0	0	0	4,046	771	17	3,894
3	LAUNDRY ROOM	1	1	88	88	0	0	0	0	0	4	2	140
Zone	3 Total/Ave.				88	0	0	0	0	0	4	2	140
System	2 Total/Ave.				88	0	0	0	0	0	4	2	140
4	MECH ROOM	1	1	167	167	0	0	0	0	167	8	3	289
Zone	4 Total/Ave.				167	0	0	0	0	167	8	3	289
System	3 Total/Ave.				167	0	0	0	0	167	8	3	289
Building					8,092	0	0	0	0	4,213	783	15	4,323

ASHRAE 90 ANALYSIS - ALTERNATIVE 1
BASE BUILDING

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.072 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.298 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.196 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 4.77 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTVw) = 20.63 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1
BASE BUILDING

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.8	16	164	-16,466	5	252	601.2	0	0	0.0	0	0
5 - 10	1.6	7	69	-32,933	5	254	1,202.3	0	0	0.0	0	0
10 - 15	2.4	7	74	-49,399	15	682	1,803.5	0	0	0.0	0	0
15 - 20	3.2	6	61	-65,865	34	1,582	2,404.6	42	3,650	0.0	0	0
20 - 25	4.0	7	72	-82,332	3	147	3,005.8	0	0	0.0	0	0
25 - 30	4.8	18	190	-98,798	9	398	3,606.9	0	0	0.0	0	0
30 - 35	5.6	10	104	-115,264	5	242	4,208.1	0	0	0.0	0	0
35 - 40	6.4	16	166	-131,731	2	113	4,809.2	0	0	0.0	0	0
40 - 45	7.2	5	53	-148,197	5	245	5,410.4	0	0	0.0	0	0
45 - 50	8.0	2	20	-164,663	8	355	6,011.6	21	1,825	0.0	0	0
50 - 55	8.8	2	20	-181,130	1	39	6,612.7	0	0	0.0	0	0
55 - 60	9.6	2	20	-197,596	1	29	7,213.9	0	0	0.0	0	0
60 - 65	10.4	0	0	-214,062	1	31	7,815.0	0	0	0.0	0	0
65 - 70	11.3	0	0	-230,529	6	255	8,416.2	0	0	0.0	0	0
70 - 75	12.1	0	0	-246,995	0	0	9,017.3	0	0	0.0	0	0
75 - 80	12.9	0	0	-263,461	0	0	9,618.5	0	0	0.0	0	0
80 - 85	13.7	2	20	-279,928	0	0	10,219.7	0	0	0.0	0	0
85 - 90	14.5	1	11	-296,394	0	0	10,820.8	0	0	0.0	0	0
90 - 95	15.3	0	0	-312,860	0	0	11,422.0	0	0	0.0	0	0
95 - 100	16.1	0	0	-329,327	0	0	12,023.1	38	3,285	0.0	0	0
Hours Off	0.0	0	7,716	0	0	4,136	0.0	0	0	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1
 BASE BUILDING

----- B U I L D I N G T E M P E R A T U R E P R O F I L E S -----

Temperature Range (F)	----- Zone Number -----			
	1	2	3	4

Max. Temp.	80.1	80.4	103.8	96.5
Mo./Hr.	7 14	7 14	8 23	7 21
Day Type	1	1	1	1

	..... Number of Hours			
Above 100	0	0	918	0
95 - 100	0	0	1,117	30
90 - 95	0	0	893	864
85 - 90	0	0	168	1,190
80 - 85	0	0	576	597
75 - 80	2,893	2,942	119	925
70 - 75	779	730	363	66
65 - 70	4,893	4,760	4,606	68
60 - 65	195	328	0	630
55 - 60	0	0	0	814
50 - 55	0	0	0	543
Below 50	0	0	0	3,033

Min. Temp.	63.9	63.4	67.9	31.7
Mo./Hr.	2 15	2 15	3 24	2 10
Day Type	2	3	1	5

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1
BASE BUILDING

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	HOT WTR	HOT W DMND
	Off Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	2,632	8	862	2
Feb	2,378	8	819	2
March	2,659	8	555	2
April	2,541	8	212	1
May	2,640	9	0	0
June	2,896	9	0	0
July	3,123	9	0	0
Aug	2,993	9	0	0
Sept	2,537	9	0	0
Oct	2,643	8	191	1
Nov	2,543	8	418	1
Dec	2,619	8	745	2
Total	32,204	9	3,801	2

Building Energy Consumption = 60,554 (Btu/Sq Ft/Year)
Source Energy Consumption = 103,381 (Btu/Sq Ft/Year)

Floor Area = 8,092 (Sq Ft)

----- EQUIPMENT ENERGY CONSUMPTION -----

[illegible]

Trane Air Conditioning Economics
By: Trane Customer Direct Service Network

V 600
PAGE 12

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1
BASE BUILDING[illegible]

UTILITY PEAK CHECKSUMS - ALTERNATIVE 1
BASE BUILDING

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 9.0 (kW)
Yearly Time of Peak 16 (hr) 7 (mo)

Hour 16 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Percent Of Tot (%)
----------------------	------------------------	-----------------------	---------------------------	--------------------------

Cooling Equipment

1	ED1161	AIR-CLD COND COMP <15 TONS	1.2	13.53
Sub Total			1.2	13.53
Sub Total			0.0	0.00

Air Moving Equipment

1		SUMMATION OF FAN ELECTRICAL DEMAND	3.7	41.37
Sub Total			3.7	41.37
Sub Total			0.0	0.00

Miscellaneous

	Lights		4.1	45.10
	Base Utilities		0.0	0.00
	Misc Equipment		0.0	0.00
Sub Total			4.1	45.10
Grand Total			9.0	100.00

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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 40

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Relectance: 0.20
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 15: 5:24 1/11/94
Dataset Name: CB40 .TM

AIRFLOW - ALTERNATIVE 2
WALL & ROOF INSULATION

----- S Y S T E M S U M M A R Y -----
(Design Airflow Quantities)

System Number	System Type	Main					Auxil. Supply Airflow (Cfm)	Room Exhaust Airflow (Cfm)
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)		
1	FC	1,763	11,755	11,755	13,015	3,023	0	0
2	RAD	0	0	0	0	39	0	0
3	UH	0	0	248	0	80	0	0
Totals		1,763	11,755	12,003	13,015	3,142	0	0

CAPACITY - ALTERNATIVE 2
WALL & ROOF INSULATION

----- S Y S T E M S U M M A R Y -----
(Design Capacity Quantities)

System Number	System Type	Cooling				Heating						
		Main Sys.	Aux. Sys.	Opt. Vent	Cooling	Main Sys.	Aux. Sys.	Preheat	Reheat	Humidif.	Opt. Vent	Heating
		Capacity (Tons)	Capacity (Tons)	Capacity (Tons)	Totals (Tons)	Capacity (Btuh)	Capacity (Btuh)	Capacity (Btuh)	Capacity (Btuh)	Capacity (Btuh)	Capacity (Btuh)	Totals (Btuh)
1	FC	12.2	0.0	0.0	12.2	-153,286	0	-117,686	0	0	0	-153,286
2	RAD	0.0	0.0	0.0	0.0	-3,455	0	0	0	0	0	-3,455
3	UH	0.0	0.0	0.0	0.0	-15,357	0	0	0	0	0	-15,357
Totals		12.2	0.0	0.0	12.2	-172,098	0	-117,686	0	0	0	-172,098

The building peaked at hour 16 month 7 with a capacity of 12.2 tons

ENGINEERING CHECKS - ALTERNATIVE 2
WALL & ROOF INSULATION

----- E N G I N E E R I N G C H E C K S -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	Cooling				Heating		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	FC	15.00	1.50	961.7	641.1	18.72	1.50	-19.56	7,837
2	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-39.26	88
3	Main	UH	0.00	0.00	0.0	0.0	0.00	1.48	-91.96	167

System 1 Block FC - FAN COIL

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/16 * Mo/Hr: 7/17 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 * OADB: 89 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	9,789	0		9,789	6.67	*	10,710	11.15	*	-10,529	-10,529	7.12
Glass Solar	33,171	0		33,171	22.61	*	36,692	38.19	*	0	0	0.00
Glass Cond	7,452	0		7,452	5.08	*	7,128	7.42	*	-35,586	-35,586	24.08
Wall Cond	5,614	276		5,891	4.02	*	6,016	6.26	*	-13,296	-13,955	9.44
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	29,812			29,812	20.32	*	19,463	20.26	*	-87,722	-87,722	59.36
Sub Total==>	85,839	276		86,115	58.71	*	80,010	83.28	*	-147,133	-147,792	100.00
Internal Loads												
Lights	10,699	0		10,699	7.29	*	10,967	11.41	*	0	0	0.00
People	7,388			7,388	5.04	*	3,818	3.97	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	18,087	0	0	18,087	12.33	*	14,785	15.39	*	0	0	0.00
Ceiling Load	1,394	-1,394		0	0.00	*	1,280	1.33	*	-1,549	0	0.00
Outside Air	0	0	0	41,263	28.13	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				2,508	1.71	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		-1,284	0	-1,284	-0.88	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	-0.00	*		0.00	*		0	0.00
Grand Total==>	105,320	-2,402	0	146,688	100.00	*	96,074	100.00	*	-148,683	-147,792	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total Floor	Glass (sf)	(%)
Main Clg	12.2	146.7	11,755	78.0 68.0 89.8	67.4 64.4 88.5	7,837		
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Part	0	
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	0	
Totals	12.2	146.7				Roof	4,046	0 0
						Wall	4,665	771 17

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	Clg % OA	15.0	Type	Clg	Htg
Main Htg	-153.3	11,755	67.6	79.6	Vent	1,763	0	Clg Cfm/Sqft	1.50	SADB	67.5	79.6
Aux Htg	0.0	0	0.0	0.0	Infil	1,260	1,260	Clg Cfm/Ton	961.67	Plenum	75.7	67.3
Preheat	-117.7	11,755	58.1	67.3	Supply	11,755	11,755	Clg Sqft/Ton	641.11	Return	75.7	67.6
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	18.72	Ret/OA	77.9	67.6
Humidif	0.0	0	0.0	0.0	Return	11,755	11,755	No. People	20	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	1,763	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-153.3				Rm Exh	0	0	Htg Cfm/Sqft	1.50	Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/Sqft	-19.56	Fn Frict	0.1	0.1

System 2 Block RAD - RADIATION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads						*			*			
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-244	-244	7.06
Wall Cond	0	0		0	0.00	*	0	0.00	*	-457	-503	14.56
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-2,708	-2,708	78.38
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-3,409	-3,455	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	-46	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-3,455	-3,455	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total Floor	Glass (sf) (%)
Main Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	88	
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0	
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0	
Totals	0.0	0.0				144	4 2

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
Main Htg	-3.5	0	0.0	0.0	Vent	0	0	Clg Cfm/Sqft	0.00	SADB	0.0	68.1
Aux Htg	0.0	0	0.0	0.0	Infil	0	39	Clg Cfm/Ton	0.00	Plenum	0.0	67.1
Preheat	0.0	0	0.0	0.0	Supply	0	0	Clg Sqft/Ton	0.00	Return	0.0	67.1
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	67.1
Humidif	0.0	0	0.0	0.0	Return	0	0	No. People	0	Runarnd	0.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-3.5				Rm Exh	0	0	Htg Cfm/SqFt	0.00	Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/SqFt	-39.26	Fn Frict	0.0	0.0

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 3 Block UH - UNIT HEATERS

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	-4,428	-4,428	28.83
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-573	-573	3.73
Wall Cond	0	0		0	0.00	*	0	0.00	*	-4,762	-4,762	31.01
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-5,594	-5,594	36.43
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-15,357	-15,357	100.00
Internal Loads												
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-15,357	-15,357	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	Part	167	
Aux Clg	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	0	
Opt Vent	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	Roof	167	0 0
Totals	0.0	0.0				Wall	297	8 3

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent	0	0	Clg Cfm/Sqft	0.00	SADB	0.0	125.0
Main Htg	-15.4	248	68.0	125.0	Infil	0	80	Clg Cfm/Ton	0.00	Plenum	0.0	68.0
Aux Htg	0.0	0	0.0	0.0	Supply	0	248	Clg Sqft/Ton	0.00	Return	0.0	68.0
Preheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	68.0
Reheat	0.0	0	0.0	0.0	Return	0	248	No. People	0	Runarnd	0.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	1.48	Fn BldTD	0.0	0.0
Total	-15.4				Auxil	0	0	Htg Btuh/Sqft	-91.96	Fn Frict	0.1	0.0

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

BUILDING U-VALUES - ALTERNATIVE 2
WALL & ROOF INSULATION

----- B U I L D I N G U - V A L U E S -----

Room Number	Description	Room U-Values (Btu/hr/sqft/F)									Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
		Part.	ExFlr	Summr Skylt	Wintr Skylt	Roof	Summr Windo	Wintr Windo	Wall	Ceil.		
1	1ST FL APT'S	0.000	0.000	0.000	0.000	0.000	0.700	0.720	0.056	0.549	41.8	8.83
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.700	0.720	0.056	0.549	41.8	8.83
2	2ND FL APT'S	0.000	0.000	0.000	0.000	0.041	0.700	0.720	0.056	0.000	42.9	12.53
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.700	0.720	0.056	0.000	42.9	12.53
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.700	0.720	0.056	0.549	42.4	10.74
3	LAUNDRY ROOM	0.000	0.000	0.000	0.000	0.000	1.040	1.086	0.056	0.549	96.4	20.92
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	1.040	1.086	0.056	0.549	96.4	20.92
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	1.040	1.086	0.056	0.549	96.4	20.92
4	MECH ROOM	0.000	0.000	0.000	0.000	0.414	1.040	1.086	0.257	0.000	123.1	27.06
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.414	1.040	1.086	0.257	0.000	123.1	27.06
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.414	1.040	1.086	0.257	0.000	123.1	27.06
Building		0.000	0.000	0.000	0.000	0.055	0.705	0.726	0.069	0.549	44.6	11.19

BUILDING AREAS - ALTERNATIVE 2
WALL & ROOF INSULATION

----- B U I L D I N G A R E A S -----

Room Number	Description	Number of Duplicate		Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skf /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
		Flr	Rm										
Zone 1	1ST FL APT'S	1	1	3,791	3,791	0	0	0	0	0	336	16	1,728
	1 Total/Ave.				3,791	0	0	0	0	0	336	16	1,728
Zone 2	2ND FL APT'S	1	1	4,046	4,046	0	0	0	0	4,046	435	17	2,166
	2 Total/Ave.				4,046	0	0	0	0	4,046	435	17	2,166
System	1 Total/Ave.				7,837	0	0	0	0	4,046	771	17	3,894
Zone 3	LAUNDRY ROOM	1	1	88	88	0	0	0	0	0	4	2	140
	3 Total/Ave.				88	0	0	0	0	0	4	2	140
System	2 Total/Ave.				88	0	0	0	0	0	4	2	140
Zone 4	MECH ROOM	1	1	167	167	0	0	0	0	167	8	3	289
	4 Total/Ave.				167	0	0	0	0	167	8	3	289
System	3 Total/Ave.				167	0	0	0	0	167	8	3	289
Building					8,092	0	0	0	0	4,213	783	15	4,323

Trane Air Conditioning Economics
By: Trane Customer Direct Service Network

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ASHRAE 90 ANALYSIS - ALTERNATIVE 2
WALL & ROOF INSULATION

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.055 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.167 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.117 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.49 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTVw) = 16.32 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2
 WALL & ROOF INSULATION

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.6	10	100	-14,489	7	331	600.2	0	0	0.0	0	0
5 - 10	1.2	10	103	-28,978	7	334	1,200.3	0	0	0.0	0	0
10 - 15	1.8	6	62	-43,468	37	1,667	1,800.5	0	0	0.0	0	0
15 - 20	2.4	5	50	-57,957	9	411	2,400.6	42	3,650	0.0	0	0
20 - 25	3.1	8	81	-72,446	6	265	3,000.8	0	0	0.0	0	0
25 - 30	3.7	18	178	-86,935	9	421	3,600.9	0	0	0.0	0	0
30 - 35	4.3	9	92	-101,424	4	178	4,201.1	0	0	0.0	0	0
35 - 40	4.9	11	114	-115,914	2	102	4,801.2	0	0	0.0	0	0
40 - 45	5.5	14	143	-130,403	8	374	5,401.4	0	0	0.0	0	0
45 - 50	6.1	2	20	-144,892	2	101	6,001.5	21	1,825	0.0	0	0
50 - 55	6.7	2	20	-159,381	6	276	6,601.7	0	0	0.0	0	0
55 - 60	7.3	2	20	-173,870	0	0	7,201.8	0	0	0.0	0	0
60 - 65	7.9	0	0	-188,359	0	0	7,802.0	0	0	0.0	0	0
65 - 70	8.6	0	0	-202,849	0	0	8,402.2	0	0	0.0	0	0
70 - 75	9.2	2	20	-217,338	0	0	9,002.3	0	0	0.0	0	0
75 - 80	9.8	1	11	-231,827	0	0	9,602.5	0	0	0.0	0	0
80 - 85	10.4	0	0	-246,316	0	0	10,202.6	0	0	0.0	0	0
85 - 90	11.0	0	0	-260,805	0	0	10,802.8	0	0	0.0	0	0
90 - 95	11.6	0	0	-275,295	0	0	11,402.9	0	0	0.0	0	0
95 - 100	12.2	0	0	-289,784	0	0	12,003.1	38	3,285	0.0	0	0
Hours Off	0.0	0	7,746	0	0	4,300	0.0	0	0	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2
WALL & ROOF INSULATION

----- B U I L D I N G T E M P E R A T U R E P R O F I L E S -----

Temperature Range (F)	----- Zone Number -----			
	1	2	3	4
Max. Temp.	79.6	79.5	123.3	96.5
Mo./Hr.	7 14	7 14	9 23	7 21
Day Type	1	1	1	1
	..... Number of Hours			
Above 100	0	0	2,676	0
95 - 100	0	0	286	30
90 - 95	0	0	216	864
85 - 90	0	0	422	1,190
80 - 85	0	0	311	597
75 - 80	2,989	3,054	415	961
70 - 75	683	635	90	30
65 - 70	5,088	5,015	4,344	85
60 - 65	0	56	0	733
55 - 60	0	0	0	710
50 - 55	0	0	0	537
Below 50	0	0	0	3,023
Min. Temp.	65.2	64.7	67.9	32.1
Mo./Hr.	2 15	2 15	3 23	2 10
Day Type	2	3	1	5

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2
WALL & ROOF INSULATION

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	HOT WTR	HOT W DMND
	Off Peak (kWh)	On Peak (kW)	On Peak (Thrm)	On Peak (Thrm/hr)
Jan	2,631	8	635	2
Feb	2,377	8	607	2
March	2,658	8	405	1
April	2,540	8	141	1
May	2,640	8	0	0
June	2,865	9	0	0
July	3,120	9	0	0
Aug	2,989	9	0	0
Sept	2,537	9	0	0
Oct	2,642	8	105	1
Nov	2,542	8	297	1
Dec	2,618	8	543	2
Total	32,160	9	2,732	2

Building Energy Consumption = 47,328 (Btu/Sq Ft/Year)
Source Energy Consumption = 85,715 (Btu/Sq Ft/Year)

Floor Area = 8,092 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2
WALL & ROOF INSULATION

EQUIPMENT ENERGY CONSUMPTION

Ref Num	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS ELEC PK	1072 4.1	968 4.1	1098 4.1	1033 4.1	1085 4.1	1060 4.1	1058 4.1	1098 4.1	1033 4.1	1085 4.1	1033 4.1	1058 4.1	12,683 4.1
1	MISC LD ELEC PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
2	MISC LD GAS PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
3	MISC LD OIL PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
4	MISC LD P STEAM PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
5	MISC LD P HOTW20 PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
6	MISC LD P CHILL PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
1	EQ1161 ELEC PK	AIR-CLD COND COMP <15 TONS												
		0	0	0	0	0	200	334	221	0	0	0	0	754
		0.0	0.0	0.0	0.0	0.0	0.8	0.8	0.8	0.8	0.0	0.0	0.0	0.8
1	EQ5200 ELEC PK	CONDENSER FANS												
		0	0	0	0	0	20	34	22	0	0	0	0	76
		0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1
1	EQ5303 ELEC PK	CONTROLS												
		0	0	0	0	0	81	140	93	0	0	0	0	313
		0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
1	EQ4371 ELEC PK	FAN COIL SUPPLY FAN												
		1555	1404	1555	1504	1555	1504	1555	1555	1504	1555	1504	1555	18,304
		3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
1	EQ2102 P HOTW20 PK	PURCHASED DIST. HOT WATER												
		635	607	405	141	0	0	0	0	0	105	297	543	2,732
		1.5	1.5	1.3	0.8	0.0	0.0	0.0	0.0	0.0	0.8	1.1	1.5	1.5
1	EQ5020	HEAT WATER CIRC. PUMP C.V.												

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[illegible]

UTILITY PEAK CHECKSUMS - ALTERNATIVE 2
WALL & ROOF INSULATION

----- UTILITY PEAK CHECKSUMS -----

Utility ELECTRIC DEMAND

Peak Value 9.0 (kW)
Yearly Time of Peak 16 (hr) 7 (mo)

Hour 16 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Percent Of Tot (%)
----------------------	------------------------	-----------------------	---------------------------	--------------------------

Cooling Equipment

1	EQ1161	AIR-CLD COND COMP <15 TONS	1.2	13.53
Sub Total			1.2	13.53
Sub Total			0.0	0.00

Air Moving Equipment

1		SUMMATION OF FAN ELECTRICAL DEMAND	3.7	41.37
Sub Total			3.7	41.37
Sub Total			0.0	0.00

Miscellaneous

	Lights		4.1	45.10
	Base Utilities		0.0	0.00
	Misc Equipment		0.0	0.00
Sub Total			4.1	45.10

Grand Total			9.0	100.00
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Building 045
Trace Input File

933702

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5 01/BENATEC ASSOCIATES

6 01/BUILDING 45

7 08/CARLISLE

8 09/MAY/SEP////APR/OCT

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32 25/1/4/166/1/1/.55/.57

33 25/2/1/4.25/2.25/5/.55/.57

34 25/2/2/4.25/2.25/4/.55/.57

35 25/2/3/4.25/2.25/8/.55/.57

36 25/3/1/4.25/2.25/1/.55/.57

37 25/3/2/4.25/2.25/1/.55/.57

38 26/1/CBAPD&L/CBAPD&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF

39 26/2/CBAPD&L/CBAPD&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF

40 26/3/CBAPD&L/CBAPD&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF

41 27/1/118/SF-PERS/255/255/1.67/WATT-SF

42 27/2/////1.3/WATT-SF

43 27/3/////1.3/WATT-SF

44 29/1/////0.36/CFM-SF/.36/CFM-SF

45 29/2/////0.36/CFM-SF

46 29/3/////0.36/CFM-SF/.36/CFM-SF

47 30/1/5519/CFM

48 SYSTEM - 1

49 39/1/BASE BUILDING

50 40/1/SZ

51 41/1/1/1

52 42/1/1

53 45/1/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

54 40/2/PTAC

55 41/2/3/3

56 42/2/.25

57 45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

58 40/3/RAD

CONTENTS OF : E:\CB45.TM

LINE #	-----
59	41/3/1/3
60	45/3/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
61	EQUIPMENT - 1
62	59/1/CARLISLE///BASE BUILDING
63	60/1/1/BLKPLANT/1/1
64	60/2/2/BLKPLANT/2/2
65	62/1/EQ1161/1
66	62/2/EQ1161/1
67	65/1/1//3/3
68	67/1/EQ2102/1
69	69/1/EQ4003
70	69/2/EQ4003
71	LOAD - 2
72	19/2/WALL & ROOF INSULATION
73	20/1/1/OFFICES/4954/1/1/0//9
74	20/2/2/CORRIDOR TOILETS/1132/1/1/0//9
75	20/3/3/WOMENS TOILET/108/1/1/0//9
76	21/M////CBADCTX///CBADHTX
77	22/1/1/YES////191
78	22/2/1/YES////191
79	22/3/1/YES////191
80	24/1/1/100/7.3//123/18
81	24/1/2/163/7.3//123/108
82	24/1/3/38/7.3//123/198
83	24/1/4/155/7.3//123/288
84	24/2/1/44/7.3//123/108
85	24/2/2/39/7.3//123/198
86	24/2/3/64/7.3//123/288
87	24/3/1/12/7.3//123/108
88	24/3/2/9/7.3//123/198
89	25/1/1/94.1/1/1/.55/.57
90	25/1/2/175/1/1/.55/.57
91	25/1/3/4.25/2.25/4/.55/.57
92	25/1/4/166/1/1/.55/.57
93	25/2/1/4.25/2.25/5/.55/.57
94	25/2/2/4.25/2.25/4/.55/.57
95	25/2/3/4.25/2.25/8/.55/.57
96	25/3/1/4.25/2.25/1/.55/.57
97	25/3/2/4.25/2.25/1/.55/.57
98	26/1/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF
99	26/2/CBADP&L/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF
100	26/3/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF
101	27/1/118/SF-PERS/255/255/1.67/WATT-SF
102	27/2/////1.3/WATT-SF
103	27/3/////1.3/WATT-SF
104	29/1/////0.30/CFM-SF/.30/CFM-SF
105	29/2/////0.30/CFM-SF
106	29/3/////0.30/CFM-SF/.30/CFM-SF
107	30/1/5519/CFM
108	SYSTEM - 2
109	39/2/WALL & ROOF INSULATION
110	40/1/SZ
111	41/1/1/1
112	42/1/1
113	45/1/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
114	40/2/PTAC
115	41/2/3/3
116	42/2/.25

CONTENTS OF : E:\CB45.TM

LINE #	
117	45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
118	40/3/RAD
119	41/3/1/3
120	45/3/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
121	EQUIPMENT - 2
122	59/2/CARLISLE///WALL & ROOF INSULATION
123	60/1/1/BLKPLANT/1/1
124	60/2/2/BLKPLANT/2/2
125	62/1/EQ1161/1
126	62/2/EQ1161/1
127	65/1/1//3/3
128	67/1/EQ2102/1
129	69/1/EQ4003
130	69/2/EQ4003
131	LOAD - 3
132	19/3/WEATHERSTRIP & CAULKING
133	20/1/1/OFFICES/4954/1/1/0//9
134	20/2/2/CORRIDOR TOILETS/1132/1/1/0//9
135	20/3/3/WOMENS TOILET/108/1/1/0//9
136	21/M///CBADCTX///CBADHTX
137	22/1/1/YES///154
138	22/2/1/YES///154
139	22/3/1/YES///154
140	24/1/1/100/7.3//196/18
141	24/1/2/163/7.3//196/108
142	24/1/3/38/7.3//196/198
143	24/1/4/155/7.3//196/288
144	24/2/1/44/7.3//196/108
145	24/2/2/39/7.3//196/198
146	24/2/3/64/7.3//196/288
147	24/3/1/12/7.3//196/108
148	24/3/2/9/7.3//196/198
149	25/1/1/94.1/1/1/.55/.57
150	25/1/2/175/1/1/.55/.57
151	25/1/3/4.25/2.25/4/.55/.57
152	25/1/4/166/1/1/.55/.57
153	25/2/1/4.25/2.25/5/.55/.57
154	25/2/2/4.25/2.25/4/.55/.57
155	25/2/3/4.25/2.25/8/.55/.57
156	25/3/1/4.25/2.25/1/.55/.57
157	25/3/2/4.25/2.25/1/.55/.57
158	26/1/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF
159	26/2/CBADP&L/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF
160	26/3/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF
161	27/1/118/SF-PERS/255/255/1.67/WATT-SF
162	27/2/////1.3/WATT-SF
163	27/3/////1.3/WATT-SF
164	29/1/////29/CFM-SF/.29/CFM-SF
165	29/2/////29/CFM-SF
166	29/3/////29/CFM-SF/.29/CFM-SF
167	30/1/5519/CFM
168	SYSTEM - 3
169	39/3/WEATHERSTRIP & CAULKING
170	40/1/SZ
171	41/1/1/1
172	42/1/1
173	45/1/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
174	40/2/PTAC

CONTENTS OF : E:\CB45.TM

LINE #	
175	41/2/3/3
176	42/2/.25
177	45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
178	40/3/RAD
179	41/3/1/3
180	45/3/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
181	EQUIPMENT - 3
182	59/3/CARLISLE///WEATHERSTRIP & CAULKING
183	60/1/1/BLKPLANT/1/1
184	60/2/2/BLKPLANT/2/2
185	62/1/EQ1161/1
186	62/2/EQ1161/1
187	65/1/1//3/3
188	67/1/EQ2102/1
189	69/1/EQ4003
190	69/2/EQ4003
191	LOAD - 4
192	19/4/REPLACE FLUORESCENT LAMPS
193	20/1/1/OFFICES/4954/1/1/0//9
194	20/2/2/CORRIDOR TOILETS/1132/1/1/0//9
195	20/3/3/WOMENS TOILET/108/1/1/0//9
196	21/M////CBADCTX///CBADHTX
197	22/1/1/YES////154
198	22/2/1/YES////154
199	22/3/1/YES////154
200	24/1/1/100/7.3//196/18
201	24/1/2/163/7.3//196/108
202	24/1/3/38/7.3//196/198
203	24/1/4/155/7.3//196/288
204	24/2/1/44/7.3//196/108
205	24/2/2/39/7.3//196/198
206	24/2/3/64/7.3//196/288
207	24/3/1/12/7.3//196/108
208	24/3/2/9/7.3//196/198
209	25/1/1/94.1/1/1/.55/.57
210	25/1/2/175/1/1/.55/.57
211	25/1/3/4.25/2.25/4/.55/.57
212	25/1/4/166/1/1/.55/.57
213	25/2/1/4.25/2.25/5/.55/.57
214	25/2/2/4.25/2.25/4/.55/.57
215	25/2/3/4.25/2.25/8/.55/.57
216	25/3/1/4.25/2.25/1/.55/.57
217	25/3/2/4.25/2.25/1/.55/.57
218	26/1/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF
219	26/2/CBADP&L/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF
220	26/3/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF
221	27/1/118/SF-PERS/255/255/1.46/WATT-SF
222	27/2/////1.14/WATT-SF
223	27/3/////0.80/WATT-SF
224	29/1/////0.36/CFM-SF/.36/CFM-SF
225	29/2/////0.36/CFM-SF
226	29/3/////0.36/CFM-SF/.36/CFM-SF
227	30/1/5519/CFM
228	SYSTEM - 4
229	39/4/REPLACE FLUORESCENT LAMPS
230	40/1/SZ
231	41/1/1/1
232	42/1/1

CONTENTS OF : E:\CB45.TM

LINE #	-----
233	45/1/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
234	40/2/PTAC
235	41/2/3/3
236	42/2/.25
237	45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
238	40/3/RAD
239	41/3/1/3
240	45/3/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
241	EQUIPMENT - 4
242	59/4/CARLISLE///REPLACE FLUORESCENT LAMPS
243	60/1/1/BLKPLANT/1/1
244	60/2/2/BLKPLANT/2/2
245	62/1/EQ1161/1
246	62/2/EQ1161/1
247	65/1/1//3/3
248	67/1/EQ2102/1
249	69/1/EQ4003
250	69/2/EQ4003

CONTENTS OF : E:\CB45B.TM

LINE # -----

1 JOB - 1

2 01/ENERGY SAVINGS OPPORTUNITY STUDY

3 01/CARLISLE BARRACKS, PA

4 01/DEPARTMENT OF THE ARMY

5 01/BENATEC ASSOCIATES

6 01/BUILDING 45

7 08/CARLISLE

8 09/MAY/SEP////APR/OCT

9 10/CLTD-CLF

10 11///ZONE

11 LOAD - 1

12 19/1/REPLACE FLUORESCENT BALLASTS

13 20/1/1/OFFICES/4954/1/1/0//9

14 20/2/2/CORRIDOR TOILETS/1132/1/1/0//9

15 20/3/3/WOMENS TOILET/108/1/1/0//9

16 21/M////CBADCTX//CBADHTX

17 22/1/1/YES////154

18 22/2/1/YES////154

19 22/3/1/YES////154

20 24/1/1/100/7.3//196/18

21 24/1/2/163/7.3//196/108

22 24/1/3/38/7.3//196/198

23 24/1/4/155/7.3//196/288

24 24/2/1/44/7.3//196/108

25 24/2/2/39/7.3//196/198

26 24/2/3/64/7.3//196/288

27 24/3/1/12/7.3//196/108

28 24/3/2/9/7.3//196/198

29 25/1/1/94.1/1/1/.55/.57

30 25/1/2/175/1/1/.55/.57

31 25/1/3/4.25/2.25/4/.55/.57

32 25/1/4/166/1/1/.55/.57

33 25/2/1/4.25/2.25/5/.55/.57

34 25/2/2/4.25/2.25/4/.55/.57

35 25/2/3/4.25/2.25/8/.55/.57

36 25/3/1/4.25/2.25/1/.55/.57

37 25/3/2/4.25/2.25/1/.55/.57

38 26/1/CBAPD&L/CBAPD&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF

39 26/2/CBAPD&L/CBAPD&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF

40 26/3/CBAPD&L/CBAPD&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF

41 27/1/118/SF-PERS/255/255/1.24/WATT-SF

42 27/2/////97/WATT-SF

43 27/3/////68/WATT-SF

44 29/1/////36/CFM-SF/.36/CFM-SF

45 29/2/////36/CFM-SF

46 29/3/////36/CFM-SF/.36/CFM-SF

47 30/1/5519/CFM

48 SYSTEM - 1

49 39/1/REPLACE FLUORESCENT BALLAST

50 40/1/SZ

51 41/1/1/1

52 42/1/1

53 45/1/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

54 40/2/PTAC

55 41/2/3/3

56 42/2/.2

57 45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

58 40/3/RAD

CONTENTS OF : E:\CB45B.TM

LINE #	-----
59	41/3/1/3
60	45/3/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
61	EQUIPMENT - 1
62	59/1/CARLISLE///REPLACE FLUORESCENT BALLASTS
63	60/1/1/BLKPLANT/1/1
64	60/2/2/BLKPLANT/2/2
65	62/1/EQ1161/1
66	62/2/EQ1161/1
67	65/1/1//3/3
68	67/1/EQ2102/1
69	69/1/EQ4003
70	69/2/EQ4003
71	LOAD - 2
72	19/2/REPLACE FLUORESCENT FIXTURES
73	20/1/1/OFFICES/4954/1/1/0//9
74	20/2/2/CORRIDOR TOILETS/1132/1/1/0//9
75	20/3/3/WOMENS TOILET/108/1/1/0//9
76	21/M///CBADCTX///CBADHTX
77	22/1/1/YES///154
78	22/2/1/YES///154
79	22/3/1/YES///154
80	24/1/1/100/7.3//196/18
81	24/1/2/163/7.3//196/108
82	24/1/3/38/7.3//196/198
83	24/1/4/155/7.3//196/288
84	24/2/1/44/7.3//196/108
85	24/2/2/39/7.3//196/198
86	24/2/3/64/7.3//196/288
87	24/3/1/12/7.3//196/108
88	24/3/2/9/7.3//196/198
89	25/1/1/94.1/1/1/.55/.57
90	25/1/2/175/1/1/.55/.57
91	25/1/3/4.25/2.25/4/.55/.57
92	25/1/4/166/1/1/.55/.57
93	25/2/1/4.25/2.25/5/.55/.57
94	25/2/2/4.25/2.25/4/.55/.57
95	25/2/3/4.25/2.25/8/.55/.57
96	25/3/1/4.25/2.25/1/.55/.57
97	25/3/2/4.25/2.25/1/.55/.57
98	26/1/CBAPD&L/CBAPD&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF
99	26/2/CBAPD&L/CBAPD&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF
100	26/3/CBAPD&L/CBAPD&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF
101	27/1/118/SF-PERS/255/255/1.03/WATT-SF
102	27/2/////81/WATT-SF
103	27/3/////56/WATT-SF
104	29/1/////36/CFM-SF/.36/CFM-SF
105	29/2/////36/CFM-SF
106	29/3/////36/CFM-SF/.36/CFM-SF
107	30/1/5519/CFM
108	SYSTEM - 2
109	39/2/REPLACE FLUORESCENT FIXTURES
110	40/1/SZ
111	41/1/1/1
112	42/1/1
113	45/1/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
114	40/2/PTAC
115	41/2/3/3
116	42/2/.2

CONTENTS OF : E:\CB45B.TM

LINE #	
117	45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
118	40/3/RAD
119	41/3/1/3
120	45/3/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
121	EQUIPMENT - 2
122	59/2/CARLISLE///REPLACE FLUORESCENT FIXTURES
123	60/1/1/BLKPLANT/1/1
124	60/2/2/BLKPLANT/2/2
125	62/1/EQ1161/1
126	62/2/EQ1161/1
127	65/1/1//3/3
128	67/1/EQ2102/1
129	69/1/EQ4003
130	69/2/EQ4003
131	LOAD - 3
132	19/3/COMBINED ECOS
133	20/1/1/OFFICES/4954/1/1/0//9
134	20/2/2/CORRIDOR TOILETS/1132/1/1/0//9
135	20/3/3/WOMENS TOILET/108/1/1/0//9
136	21/M////CBADCTX///CBADHTX
137	22/1/1/YES////191
138	22/2/1/YES////191
139	22/3/1/YES////191
140	24/1/1/100/7.3//123/18
141	24/1/2/163/7.3//123/108
142	24/1/3/38/7.3//123/198
143	24/1/4/155/7.3//123/288
144	24/2/1/44/7.3//123/108
145	24/2/2/39/7.3//123/198
146	24/2/3/64/7.3//123/288
147	24/3/1/12/7.3//123/108
148	24/3/2/9/7.3//123/198
149	25/1/1/94.1/1/1/.55/.57
150	25/1/2/175/1/1/.55/.57
151	25/1/3/4.25/2.25/4/.55/.57
152	25/1/4/166/1/1/.55/.57
153	25/2/1/4.25/2.25/5/.55/.57
154	25/2/2/4.25/2.25/4/.55/.57
155	25/2/3/4.25/2.25/8/.55/.57
156	25/3/1/4.25/2.25/1/.55/.57
157	25/3/2/4.25/2.25/1/.55/.57
158	26/1/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF
159	26/2/CBADP&L/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF
160	26/3/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF
161	27/1/118/SF-PERS/255/255/1.03/WATT-SF
162	27/2/////81/WATT-SF
163	27/3/////56/WATT-SF
164	29/1/////23/CFM-SF/.23/CFM-SF
165	29/2/////23/CFM-SF
166	29/3/////23/CFM-SF/.23/CFM-SF
167	30/1/5519/CFM
168	SYSTEM - 3
169	39/3/COMBINED ECOS
170	40/1/SZ
171	41/1/1/1
172	42/1/1
173	45/1/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
174	40/2/PTAC

CONTENTS OF : E:\CB45B.TM

LINE #	-----
175	41/2/3/3
176	42/2/.2
177	45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
178	40/3/RAD
179	41/3/1/3
180	45/3/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
181	EQUIPMENT - 3
182	59/3/CARLISLE///COMBINED ECOS
183	60/1/1/BLKPLANT/1/1
184	60/2/2/BLKPLANT/2/2
185	62/1/EQ1161/1
186	62/2/EQ1161/1
187	65/1/1//3/3
188	67/1/EQ2102/1
189	69/1/EQ4003
190	69/2/EQ4003

Building 045
Trace Output File

933702

AIRFLOW - ALTERNATIVE 1
BASE BUILDING

----- S Y S T E M S U M M A R Y -----
(Design Airflow Quantities)

System Number	System Type	Main					Auxil. Supply Airflow (Cfm)	Room Exhaust Airflow (Cfm)
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)		
1	SZ	0	5,519	5,519	6,717	1,198	0	0
2	PTAC	0	194	194	249	55	0	0
3	RAD	0	0	0	0	1,640	0	0
Totals		0	5,713	5,713	6,966	2,893	0	0

CAPACITY - ALTERNATIVE 1
BASE BUILDING

----- S Y S T E M S U M M A R Y -----
(Design Capacity Quantities)

System Number	System Type	Cooling				Heating						
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	SZ	13.3	0.0	0.0	13.3	-171,332	0	0	0	0	0	-171,332
2	PTAC	0.5	0.0	0.0	0.5	-7,403	0	0	0	0	0	-7,403
3	RAD	0.0	0.0	0.0	0.0	-232,438	0	0	0	0	0	-232,438
Totals		13.7	0.0	0.0	13.7	-411,173	0	0	0	0	0	-411,173

The building peaked at hour 16 month 7 with a capacity of 13.7 tons

ENGINEERING CHECKS - ALTERNATIVE 1
BASE BUILDING

----- E N G I N E E R I N G C H E C K S -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	Cooling				Heating		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	SZ	0.00	1.11	415.9	373.4	32.14	1.11	-34.58	4,954
2	Main	PTAC	0.00	1.80	416.4	231.9	51.75	1.80	-68.55	108
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-37.53	6,194

System 1 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/16 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct	Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot	Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)	(Btuh)	(Btuh)	(%)
Envelope Loads											
Skylite Solr	0	0		0	0.00	*	0	0.00	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	0	0	0.00
Roof Cond	22,074	0		22,074	13.86	*	22,074	18.58	-18,158	-18,158	10.60
Glass Solar	17,987	0		17,987	11.30	*	17,987	15.14	0	0	0.00
Glass Cond	3,619	0		3,619	2.27	*	3,619	3.05	-17,052	-17,052	9.95
Wall Cond	26,577	0		26,577	16.69	*	26,577	22.37	-52,660	-52,660	30.74
Partition	0			0	0.00	*	0	0.00	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	0	0	0.00
Infiltration	46,024			46,024	28.90	*	20,213	17.02	-83,461	-83,461	48.71
Sub Total==>	116,280	0		116,280	73.03	*	90,470	76.16	-171,332	-171,332	100.00
Internal Loads						*					
Lights	24,283	0		24,283	15.25	*	24,283	20.44	0	0	0.00
People	20,341			20,341	12.77	*	9,635	8.11	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	0	0	0.00
Sub Total==>	44,624	0	0	44,624	28.03	*	33,918	28.55	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	0	0	0.00
Sup. Fan Heat				3,925	2.46	*		0.00		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00		0	0.00
Duct Heat PkUp		0		0	0.00	*		0.00		0	0.00
OV/UNDR Sizing	-5,604			-5,604	-3.52	*	-5,604	-4.72	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00		0	0.00
Grand Total==>	155,300	0	0	159,225	100.00	*	118,784	100.00	-171,332	-171,332	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	13.3	159.2	122.7	5,519 75.0 62.4 66.5	54.6 52.5 56.9	4,954		
Aux Clg	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Opt Vent	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	13.3	159.2				4,954	0	0
						3,329	473	14

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent			Clg Cfm/Sqft	1.11	SADB	55.2	96.5
Main Htg	-171.3	5,519	68.0	96.5	Infil	1,198	1,198	Clg Cfm/Ton	415.94	Plenum	75.0	68.0
Aux Htg	0.0	0	0.0	0.0	Supply	5,519	5,519	Clg Sqft/Ton	373.36	Return	75.0	68.0
Preheat	-0.0	5,519	68.0	54.6	Mincfm	0	0	Clg Btuh/Sqft	32.14	Ret/OA	75.0	68.0
Reheat	0.0	0	0.0	0.0	Return	5,519	5,519	No. People	42	Runarnd	75.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.2	0.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	1.11	Fn BldTD	0.1	0.0
Total	-171.3				Auxil	0	0	Htg Btuh/Sqft	-34.58	Fn Frict	0.4	0.0

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	416	0	0	416	7.44	*	477	11.23	*	-396	-396	5.35
Glass Solar	784	0	0	784	14.03	*	765	18.01	*	0	0	0.00
Glass Cond	136	0	0	136	2.43	*	145	3.42	*	-689	-689	9.31
Wall Cond	1,450	0	0	1,450	25.94	*	1,531	36.05	*	-2,474	-2,474	33.43
Partition	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	2,384	0	0	2,384	42.65	*	931	21.92	*	-3,844	-3,844	51.92
Sub Total==>	5,169	0	0	5,169	92.49	*	3,849	90.63	*	-7,403	-7,403	100.00
Internal Loads												
Lights	379	0	0	379	6.77	*	398	9.37	*	0	0	0.00
People	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	379	0	0	379	6.77	*	398	9.37	*	0	0	0.00
Ceiling Load	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat	0	0	0	41	0.74	*	0	0.00	*	0	0	0.00
Ret. Fan Heat	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Duct Heat Pkup	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
OV/UNDR Sizing	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Terminal Bypass	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Grand Total==>	5,548	0	0	5,589	100.00	*	4,247	100.00	*	-7,403	-7,403	100.00

-----COOLING COIL SELECTION-----											-----AREAS-----		
	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Gross	(sf)	(%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor	108	
Main Clg	0.5	5.6	4.1	194	75.1	62.5	66.5	54.8	52.5	56.8	Part	0	
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	108	0 0
Totals	0.5	5.6									Wall	153	19 12

-----HEATING COIL SELECTION-----				-----AIRFLOWS (cfm)-----				-----ENGINEERING CHECKS-----			-----TEMPERATURES (F)-----		
	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA			Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent			Clg Cfm/Sqft			SADB	54.9	103.1
Main Htg	-7.4	194	68.0	103.1	Infil	55	55	Clg Cfm/Ton	416.38		Plenum	75.0	68.0
Aux Htg	0.0	0	0.0	0.0	Supply	194	194	Clg Sqft/Ton	231.88		Return	75.0	68.0
Preheat	-0.0	194	68.0	54.7	Mincfm	0	0	Clg Btuh/Sqft	51.75		Ret/OA	75.0	68.0
Reheat	0.0	0	0.0	0.0	Return	194	194	No. People	0		Runarnd	75.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0		Fn MtrTD	0.0	0.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	1.80		Fn BldTD	0.0	0.0
Total	-7.4				Auxil	0	0	Htg Btuh/Sqft	-68.55		Fn Frict	0.1	0.0

System 3 Block RAD - RADIATION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads						*			*			
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	-22,703	-22,703	9.77
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-23,598	-23,598	10.15
Wall Cond	0	0		0	0.00	*	0	0.00	*	-71,927	-71,927	30.94
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-114,210	-114,210	49.14
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-232,438	-232,438	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0			0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-232,438	-232,438	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total Floor	Glass (sf) (%) Part ExFlr Roof Wall
Main Clg	0.0	0.0	0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	6,194	0 0
Aux Clg	0.0	0.0	0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0	0 0
Opt Vent	0.0	0.0	0.0	0 0.0 0.0 0.0	0 0.0 0.0 0.0	0	0 0
Totals	0.0	0.0				4,555	655 14

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type Vent Infil Supply Mincfm Return Exhaust Rm Exh Auxil	AIRFLOWS (cfm) Cooling Heating	-----ENGINEERING CHECKS----- Clg % OA Clg Cfm/Sqft Clg Cfm/Ton Clg Btuh/Sqft No. People Htg % OA Htg Cfm/Sqft Htg Btuh/Sqft	-----TEMPERATURES (F)----- Type Clg Htg SADB Plenum Return Ret/OA Runarnd Fn MtrTD Fn BldTD Fn Frict
Main Htg	-232.4	0	0.0	0.0	Infil	0 1,640	0.00 0.00 0.00 0 0.0	0.0 68.1
Aux Htg	0.0	0	0.0	0.0	Supply	0 0	0.00 0.00 0.00 0 0.0	0.0 68.0
Preheat	0.0	0	0.0	0.0	Mincfm	0 0	0.00 0.00 0.00 0 0.0	0.0 68.0
Reheat	0.0	0	0.0	0.0	Return	0 0	0.00 0.00 0.00 0 0.0	0.0 68.0
Humidif	0.0	0	0.0	0.0	Exhaust	0 0	0.00 0.00 0.00 0 0.0	0.0 0.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0 0	0.00 0.00 0.00 0 0.0	0.0 0.0
Total	-232.4				Auxil	0 0	-37.53 0.0 0.0	0.0 0.0

BUILDING U-VALUES - ALTERNATIVE 1
BASE BUILDING

----- B U I L D I N G U - V A L U E S -----

		Room U-Values (Btu/hr/sqft/F)									Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
Room Number	Description	Part.	ExFlr	Summr Skylt	Wintr Skylt	Roof	Summr Windo	Wintr Windo	Wall	Ceil.		
1	OFFICES	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
3	WOMENS TOILET	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
1	OFFICES	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
	2 CORRIDOR TOILETS	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	36.7	10.59
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	36.7	10.59
	3 WOMENS TOILET	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	32.0	9.63
Building		0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	31.5	9.54

BUILDING AREAS - ALTERNATIVE 1
BASE BUILDING

----- B U I L D I N G A R E A S -----

Room Number	Description	Number of Duplicate		Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed		Skl Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
		Flr	Rm				Floor Area (sqft)	Skylight Area (sqft)						
1	OFFICES	1	1	4,954	4,954	0	0	0	0	0	4,954	473	14	2,855
Zone	1 Total/Ave.				4,954	0	0	0	0	0	4,954	473	14	2,855
System	1 Total/Ave.				4,954	0	0	0	0	0	4,954	473	14	2,855
3	WOMENS TOILET	1	1	108	108	0	0	0	0	0	108	19	12	134
Zone	3 Total/Ave.				108	0	0	0	0	0	108	19	12	134
System	2 Total/Ave.				108	0	0	0	0	0	108	19	12	134
1	OFFICES	1	1	4,954	4,954	0	0	0	0	0	4,954	473	14	2,855
Zone	1 Total/Ave.				4,954	0	0	0	0	0	4,954	473	14	2,855
	2 CORRIDOR TOILETS	1	1	1,132	1,132	0	0	0	0	0	1,132	163	15	911
Zone	2 Total/Ave.				1,132	0	0	0	0	0	1,132	163	15	911
	3 WOMENS TOILET	1	1	108	108	0	0	0	0	0	108	19	12	134
Zone	3 Total/Ave.				108	0	0	0	0	0	108	19	12	134
System	3 Total/Ave.				6,194	0	0	0	0	0	6,194	655	14	3,900
Building					11,256	0	0	0	0	0	11,256	1,148	14	6,890

ASHRAE 90 ANALYSIS - ALTERNATIVE 1
BASE BUILDING

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.057 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.326 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.169 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.49 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTVw) = 21.38 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1
BASE BUILDING

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.7	6	45	-20,559	14	359	285.6	0	0	0.0	0	0
5 - 10	1.4	5	41	-41,117	24	593	571.3	0	0	0.0	0	0
10 - 15	2.1	3	22	-61,676	18	439	856.9	0	0	0.0	0	0
15 - 20	2.7	0	0	-82,235	13	312	1,142.6	0	0	0.0	0	0
20 - 25	3.4	6	45	-102,793	12	294	1,428.2	0	0	0.0	0	0
25 - 30	4.1	10	79	-123,352	1	19	1,713.9	0	0	0.0	0	0
30 - 35	4.8	8	64	-143,911	0	0	1,999.5	0	0	0.0	0	0
35 - 40	5.5	3	26	-164,469	1	36	2,265.2	0	0	0.0	0	0
40 - 45	6.2	12	92	-185,028	0	5	2,570.8	0	0	0.0	0	0
45 - 50	6.9	3	23	-205,587	0	0	2,856.5	0	0	0.0	0	0
50 - 55	7.6	12	90	-226,145	2	48	3,142.1	0	0	0.0	0	0
55 - 60	8.2	3	26	-246,704	15	375	3,427.8	0	0	0.0	0	0
60 - 65	8.9	9	68	-267,263	0	0	3,713.4	0	0	0.0	0	0
65 - 70	9.6	0	0	-287,821	0	0	3,999.1	0	0	0.0	0	0
70 - 75	10.3	8	59	-308,380	0	0	4,284.7	0	0	0.0	0	0
75 - 80	11.0	5	40	-328,939	0	0	4,570.3	0	0	0.0	0	0
80 - 85	11.7	0	0	-349,497	0	0	4,856.0	0	0	0.0	0	0
85 - 90	12.4	2	18	-370,056	0	0	5,141.6	0	0	0.0	0	0
90 - 95	13.0	2	15	-390,615	0	0	5,427.3	0	0	0.0	0	0
95 - 100	13.7	3	25	-411,173	0	0	5,712.9	100	1,070	0.0	0	0
Hours Off	0.0	0	7,982	0	0	6,280	0.0	0	7,690	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1
 BASE BUILDING

----- BUILDING TEMPERATURE PROFILES -----

Temperature Range (F)	----- Zone Number -----				
	1	3	1	2	3
Max. Temp.	87.9	88.6	106.6	103.9	102.5
Mo./Hr.	7 21	7 20	7 20	7 22	8 20
Day Type	4	4	2	1	1

	..... Number of Hours				
Above 100	0	0	902	262	94
95 - 100	0	0	774	940	760
90 - 95	0	0	886	998	1,254
85 - 90	156	147	603	742	835
80 - 85	1,355	1,154	487	654	649
75 - 80	1,837	1,821	20	76	80
70 - 75	375	560	392	154	243
65 - 70	570	378	1,828	1,988	1,929
60 - 65	684	809	959	585	883
55 - 60	722	783	743	736	829
50 - 55	689	693	1,166	1,225	1,204
Below 50	2,372	2,415	0	0	0

Min. Temp.	32.7	33.1	54.9	55.0	54.9
Mo./Hr.	2 10	2 10	12 2	1 7	2 20
Day Type	4	4	4	1	3

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1
BASE BUILDING

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	HOT WTR On Peak (Therm)	HOT W DMND On Peak (Thrm/hr)
Jan	3,519	18	519	2
Feb	3,184	18	498	2
March	3,853	18	260	2
April	3,349	18	62	2
May	4,636	40	0	0
June	5,896	41	0	0
July	6,468	42	0	0
Aug	6,164	41	0	0
Sept	4,211	40	0	0
Oct	3,684	18	51	2
Nov	3,350	18	185	2
Dec	3,351	18	422	2
Total	51,666	42	1,998	2

Building Energy Consumption = 33,415 (Btu/Sq Ft/Year)
Source Energy Consumption = 70,668 (Btu/Sq Ft/Year)

Floor Area = 11,256 (Sq Ft)

----- EQUIPMENT ENERGY CONSUMPTION

[illegible]

[illegible]

UTILITY PEAK CHECKSUMS - ALTERNATIVE 1
BASE BUILDING

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 42.0 (kW)
Yearly Time of Peak 15 (hr) 7 (mo)

Hour 15 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Percent Of Tot (%)
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Cooling Equipment

1	EQ1161	AIR-CLD COND COMP <15 TONS	20.3	48.47
2	EQ1161	AIR-CLD COND COMP <15 TONS	0.9	2.25

Sub Total			21.3	50.72
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Sub Total			0.0	0.00
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Air Moving Equipment

1		SUMMATION OF FAN ELECTRICAL DEMAND	2.4	5.63
2		SUMMATION OF FAN ELECTRICAL DEMAND	0.0	0.06

Sub Total			2.4	5.69
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Sub Total			0.0	0.00
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Miscellaneous

Lights			18.3	43.59
Base Utilities			0.0	0.00
Misc Equipment			0.0	0.00
Sub Total			18.3	43.59

Grand Total			42.0	100.00
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**          T R A C E    6 0 0    A N A L Y S I S          **  
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 45

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Reflectance: 0.20
Winter Ground Reflectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 12:54: 6 1/26/94
Dataset Name: CB45 .TM

AIRFLOW - ALTERNATIVE 2
WALL & ROOF INSULATION

----- S Y S T E M S U M M A R Y -----
(Design Airflow Quantities)

System Number	System Type	Main					Auxil.	Room
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	SZ	0	5,519	5,519	6,518	999	0	0
2	PTAC	0	96	96	142	46	0	0
3	RAD	0	0	0	0	1,367	0	0
Totals		0	5,615	5,615	6,659	2,411	0	0

CAPACITY - ALTERNATIVE 2
WALL & ROOF INSULATION

----- S Y S T E M S U M M A R Y -----
(Design Capacity Quantities)

System Number	System Type	Cooling					Heating						
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Sys. Opt. Capacity (Tons)	Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	SZ	9.4	0.0	0.0	0.0	9.4	-105,328	0	0	0	0	0	-105,328
2	PTAC	0.3	0.0	0.0	0.0	0.3	-4,559	0	0	0	0	0	-4,559
3	RAD	0.0	0.0	0.0	0.0	0.0	-143,370	0	0	0	0	0	-143,370
Totals		9.7	0.0	0.0	0.0	9.7	-253,257	0	0	0	0	0	-253,257

The building peaked at hour 16 month 7 with a capacity of 9.7 tons

ENGINEERING CHECKS - ALTERNATIVE 2
WALL & ROOF INSULATION

----- E N G I N E E R I N G C H E C K S -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	Cooling				Heating		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	SZ	0.00	1.11	588.3	528.1	22.72	1.11	-21.26	4,954
2	Main	PTAC	0.00	0.89	315.1	355.7	33.73	0.89	-42.21	108
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-23.15	6,194

System 1 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/16 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 * OADB: 91 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)		Space Sensible (Btuh)	Perct Of Tot (%)		Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	8,689	0		8,689	7.72	*	8,689	10.21	*	-8,464	-8,464	8.04
Glass Solar	17,987	0		17,987	15.98	*	17,987	21.13	*	0	0	0.00
Glass Cond	3,619	0		3,619	3.21	*	3,619	4.25	*	-17,052	-17,052	16.19
Wall Cond	4,072	0		4,072	3.62	*	4,072	4.78	*	-10,261	-10,261	9.74
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	29,654			29,654	26.34	*	16,844	19.79	*	-69,551	-69,551	66.03
Sub Total==>	64,021	0		64,021	56.87	*	51,211	60.16	*	-105,328	-105,328	100.00
Internal Loads												
Lights	24,283	0		24,283	21.57	*	24,283	28.53	*	0	0	0.00
People	20,341			20,341	18.07	*	9,635	11.32	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	44,624	0	0	44,624	39.64	*	33,918	39.84	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				3,925	3.49	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkuc		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	-0.00	*	0	-0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	108,645	0	0	112,570	100.00	*	85,130	100.00	*	-105,328	-105,328	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total Floor	Glass (sf)	(%)
Main Clg	9.4	112.6	89.1	5,519 75.0 65.1 79.3	60.2 58.6 73.2	4,954		
Aux Clg	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Opt Vent	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	9.4	112.6				4,954	0 0	
						3,329	473 14	

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
Main Htg	-105.3	5,519	68.0	85.5	Vent	0	0	Clg Cfm/Sqft	1.11	SADB	60.8	85.5
Aux Htg	0.0	0	0.0	0.0	Infil	999	999	Clg Cfm/Ton	588.33	Plenum	75.0	68.0
Preheat	-0.0	5,519	68.0	60.2	Supply	5,519	5,519	Clg Sqft/Ton	528.10	Return	75.0	68.0
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	22.72	Ret/OA	75.0	68.0
Humidif	0.0	0	0.0	0.0	Return	5,519	5,519	No. People	42	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.2	0.0
Total	-105.3				Rm Exh	0	0	Htg Cfm/Sqft	1.11	Fn BldTD	0.1	0.0
					Auxil	0	0	Htg Btuh/Sqft	-21.26	Fn Frict	0.4	0.0

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1

Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Percent		Space	Percent		Space Peak	Coil Peak	Percent
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	134	0	0	134	3.67	*	188	7.50	*	-185	-185	4.05
Glass Solar	784	0	0	784	21.52	*	765	30.49	*	0	0	0.00
Glass Cond	136	0	0	136	3.72	*	145	5.79	*	-689	-689	15.11
Wall Cond	204	0	0	204	5.60	*	237	9.46	*	-482	-482	10.58
Partition	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	1,987	0	0	1,987	54.53	*	776	30.92	*	-3,203	-3,203	70.26
Sub Total==>	3,244	0	0	3,244	89.05	*	2,111	84.15	*	-4,559	-4,559	100.00
Internal Loads												
Lights	379	0	0	379	10.39	*	398	15.85	*	0	0	0.00
People	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	379	0	0	379	10.39	*	398	15.85	*	0	0	0.00
Ceiling Load	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				20	0.56	*		0.00	*		0	0.00
Ret. Fan Heat		0	0	0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0	0	0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	3,623	0	0	3,643	100.00	*	2,509	100.00	*	-4,559	-4,559	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf) (%)	
	(Tons)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor	108	
Main Clg	0.3	3.6	2.4	96	75.1	62.5	66.5	50.8	48.9	49.6	Part	0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	108
Totals	0.3	3.6									Wall	153

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	--ENGINEERING CHECKS--		--TEMPERATURES (F)--	
	(Mbh)	(cfm)	Deg F	Deg F	Vent	0	0	Clg % OA	0.0	Type	Clg Htg
Main Htg	-4.6	96	68.0	111.8	Infil	46	46	Clg Cfm/Sqft	0.89	SADB	50.9 111.8
Aux Htg	0.0	0	0.0	0.0	Supply	96	96	Clg Cfm/Ton	315.10	Plenum	75.0 68.0
Preheat	-0.0	96	68.0	50.7	Mincfm	0	0	Clg Sqft/Ton	355.72	Return	75.0 68.0
Reheat	0.0	0	0.0	0.0	Return	96	96	Clg Btuh/Sqft	33.73	Ret/OA	75.0 68.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	No. People	0	Runarnd	75.0 68.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg % OA	0.0	Fn MtrTD	0.0 0.0
Total	-4.6				Auxil	0	0	Htg Cfm/Sqft	0.89	Fn BldTD	0.0 0.0
								Htg Btuh/Sqft	-42.21	Fn Frict	0.1 0.0

System 3 Block RAD - RADIATION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads						*			*			
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	-10,582	-10,582	7.38
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-23,598	-23,598	16.46
Wall Cond	0	0		0	0.00	*	0	0.00	*	-14,016	-14,016	9.78
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-95,175	-95,175	66.38
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-143,370	-143,370	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-143,370	-143,370	100.00

-----COOLING COIL SELECTION-----											-----AREAS-----		
	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR			Leaving DB/WB/HR				Gross Total	Glass (sf)	(%)
				Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor	6,194		
Main Clg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Part	0		
Aux Clg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0		
Opt Vent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	6,194	0	0
Totals	0.0	0.0								Wall	4,555	655	14

-----HEATING COIL SELECTION-----					-----AIRFLOWS (cfm)-----			--ENGINEERING CHECKS--		--TEMPERATURES (F)---		
	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent	0	0	Clg Cfm/Sqft	0.00	SADB	0.0	68.1
Main Htg	-143.4	0	0.0	0.0	Infil	0	1,367	Clg Cfm/Ton	0.00	Plenum	0.0	68.0
Aux Htg	0.0	0	0.0	0.0	Supply	0	0	Clg Sqft/Ton	0.00	Return	0.0	68.0
Preheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	68.0
Reheat	0.0	0	0.0	0.0	Return	0	0	No. People	0	Runarnd	0.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/SqFt	0.00	Fn BldTD	0.0	0.0
Total	-143.4				Auxil	0	0	Htg Btuh/SqFt	-23.15	Fn Frict	0.0	0.0

BUILDING U-VALUES - ALTERNATIVE 2
WALL & ROOF INSULATION

----- B U I L D I N G U - V A L U E S -----

Room Number	Description	Part.	ExFlr	Room U-Values (Btu/hr/sqft/F)							Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
				Summr Skylt	Wintr Skylt	Summr Roof	Wintr Windo	Summr Windo	Wall	Ceil.		
1	OFFICES	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	32.9	9.82
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	32.9	9.82
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	32.9	9.82
3	WOMENS TOILET	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	52.8	13.79
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	52.8	13.79
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	52.8	13.79
1	OFFICES	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	32.9	9.82
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	32.9	9.82
2	CORRIDOR TOILETS	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	39.7	11.18
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	39.7	11.18
3	WOMENS TOILET	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	52.8	13.79
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	52.8	13.79
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	34.5	10.14
Building		0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	34.0	10.03

BUILDING AREAS - ALTERNATIVE 2
WALL & ROOF INSULATION

----- B U I L D I N G A R E A S -----

		Number of		Floor	Total	Partition	Exposed	Skylight	Skl	Net Roof	Window	Win	Net Wall
Room	Description	Duplicate		Area/Dupl	Floor		Floor						
Number		Flr	Rm	Room	Area	Area	Area	Area	/Rf	Area	Area	/Wl	Area
				(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(%)	(sqft)
1	OFFICES	1	1	4,954	4,954	0	0	0	0	4,954	473	14	2,855
Zone	1 Total/Ave.				4,954	0	0	0	0	4,954	473	14	2,855
System	1 Total/Ave.				4,954	0	0	0	0	4,954	473	14	2,855
3	WOMENS TOILET	1	1	108	108	0	0	0	0	108	19	12	134
Zone	3 Total/Ave.				108	0	0	0	0	108	19	12	134
System	2 Total/Ave.				108	0	0	0	0	108	19	12	134
1	OFFICES	1	1	4,954	4,954	0	0	0	0	4,954	473	14	2,855
Zone	1 Total/Ave.				4,954	0	0	0	0	4,954	473	14	2,855
2	CORRIDOR TOILETS	1	1	1,132	1,132	0	0	0	0	1,132	163	15	911
Zone	2 Total/Ave.				1,132	0	0	0	0	1,132	163	15	911
3	WOMENS TOILET	1	1	108	108	0	0	0	0	108	19	12	134
Zone	3 Total/Ave.				108	0	0	0	0	108	19	12	134
System	3 Total/Ave.				6,194	0	0	0	0	6,194	655	14	3,900
Building					11,256	0	0	0	0	11,256	1,148	14	6,890

ASHRAE 90 ANALYSIS - ALTERNATIVE 2
WALL & ROOF INSULATION

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.027 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.127 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.068 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 1.33 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTVw) = 13.54 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2
WALL & ROOF INSULATION

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.5	4	34	-12,663	25	496	280.7	0	0	0.0	0	0
5 - 10	1.0	0	0	-25,326	13	254	561.5	0	0	0.0	0	0
10 - 15	1.5	3	30	-37,989	17	330	842.2	0	0	0.0	0	0
15 - 20	1.9	2	20	-50,651	13	247	1,122.9	0	0	0.0	0	0
20 - 25	2.4	7	61	-63,314	5	88	1,403.7	0	0	0.0	0	0
25 - 30	2.9	9	81	-75,977	1	19	1,684.4	0	0	0.0	0	0
30 - 35	3.4	7	62	-88,640	1	22	1,965.1	0	0	0.0	0	0
35 - 40	3.9	9	81	-101,303	1	20	2,245.9	0	0	0.0	0	0
40 - 45	4.4	4	34	-113,966	0	4	2,526.6	0	0	0.0	0	0
45 - 50	4.8	13	118	-126,629	1	17	2,807.3	0	0	0.0	0	0
50 - 55	5.3	5	42	-139,292	1	21	3,088.1	0	0	0.0	0	0
55 - 60	5.8	4	38	-151,954	22	432	3,368.8	0	0	0.0	0	0
60 - 65	6.3	3	27	-164,617	0	0	3,649.5	0	0	0.0	0	0
65 - 70	6.8	8	68	-177,280	0	0	3,930.3	0	0	0.0	0	0
70 - 75	7.3	2	20	-189,943	0	0	4,211.0	0	0	0.0	0	0
75 - 80	7.7	5	44	-202,606	0	0	4,491.7	0	0	0.0	0	0
80 - 85	8.2	4	35	-215,269	0	0	4,772.5	0	0	0.0	0	0
85 - 90	8.7	0	4	-227,932	0	0	5,053.2	0	0	0.0	0	0
90 - 95	9.2	0	0	-240,595	0	0	5,333.9	0	0	0.0	0	0
95 - 100	9.7	10	87	-253,257	0	0	5,614.7	100	1,070	0.0	0	0
Hours Off	0.0	0	7,874	0	0	6,810	0.0	0	7,690	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2
 WALL & ROOF INSULATION

----- BUILDING TEMPERATURE PROFILES -----						
Temperature	----- Zone Number -----					
Range (F)	1	3	1	2	3	
Max. Temp.	85.3	85.4	118.2	110.3	108.0	
Mo./Hr.	7 22	7 20	8 19	8 21	8 21	
Day Type	4	4	2	1	1	
	..... Number of Hours					
Above 100	0	0	2,812	2,054	1,926	
95 - 100	0	0	116	765	846	
90 - 95	0	0	168	129	156	
85 - 90	30	30	396	348	146	
80 - 85	1,184	944	520	376	418	
75 - 80	2,241	2,145	92	85	265	
70 - 75	653	621	424	371	350	
65 - 70	339	439	2,018	1,922	1,950	
60 - 65	1,017	865	884	1,104	1,040	
55 - 60	441	659	562	737	751	
50 - 55	1,411	733	768	869	912	
Below 50	1,444	2,324	0	0	0	
Min. Temp.	35.2	35.2	54.9	55.0	55.0	
Mo./Hr.	2 8	2 8	3 10	1 7	1 6	
Day Type	5	5	4	2	2	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2
WALL & ROOF INSULATION

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	HOT WTR	HOT W DMND
	Off Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	3,518	18	287	1
Feb	3,183	18	281	1
March	3,852	18	138	1
April	3,349	18	27	1
May	4,654	33	0	0
June	5,652	35	0	0
July	5,969	36	0	0
Aug	5,952	35	0	0
Sept	4,343	35	0	0
Oct	3,684	18	16	1
Nov	3,349	18	82	1
Dec	3,350	18	222	1
Total	50,854	36	1,053	1

Building Energy Consumption = 24,779 (Btu/Sq Ft/Year)
Source Energy Consumption = 58,743 (Btu/Sq Ft/Year)

Floor Area = 11,256 (Sq Ft)

----- EQUIPMENT ENERGY CONSUMPTION

Ref Num	Equip Code	Monthly Consumption												Total	
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec		
0	LIGHTS														
	ELEC	3516	3181	3851	3349	3684	3684	3349	3851	3349	3684	3349	3349	42,193	
	PK	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	
1	MISC LD														
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
2	MISC LD														
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
3	MISC LD														
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
4	MISC LD														
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
5	MISC LD														
	P HOTH2O	0	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
6	MISC LD														
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
1	EQ1161		AIR-CLD COND COMP <15 TONS												
	ELEC	0	0	0	0	375	1207	1802	1286	427	0	0	0	5,098	
	PK	0.0	0.0	0.0	0.0	11.3	12.6	13.0	12.6	12.1	0.0	0.0	0.0	13.0	
1	EQ5200		CONDENSER FANS												
	ELEC	0	0	0	0	38	107	175	116	43	0	0	0	478	
	PK	0.0	0.0	0.0	0.0	0.6	1.0	1.2	1.0	0.8	0.0	0.0	0.0	1.2	
1	EQ5303		CONTROLS												
	ELEC	0	0	0	0	35	66	60	69	36	0	0	0	266	
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3	
2	EQ1161		AIR-CLD COND COMP <15 TONS												
	ELEC	0	0	0	0	0	18	45	27	3	0	0	0	93	
	PK	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.4	
2	EQ5200		CONDENSER FANS												
	ELEC	0	0	0	0	0	2	4	3	0	0	0	0	9	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
2	EQ5303		CONTROLS												

[illegible]

UTILITY PEAK CHECKSUMS - ALTERNATIVE 2
WALL & ROOF INSULATION

----- UTILITY PEAK CHECKSUMS -----

Utility ELECTRIC DEMAND

Peak Value 35.9 (kW)
Yearly Time of Peak 15 (hr) 7 (mo)

Hour 15 Month 7

Eq. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Percent Of Tot (%)
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Cooling Equipment

1	EQ1161	AIR-CLD COND COMP <15 TONS	14.5	40.30
2	EQ1161	AIR-CLD COND COMP <15 TONS	0.8	2.11

Sub Total	15.2	42.41
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Sub Total	0.0	0.00
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Air Moving Equipment

1		SUMMATION OF FAN ELECTRICAL DEMAND	2.4	6.58
2		SUMMATION OF FAN ELECTRICAL DEMAND	0.0	0.03

Sub Total	2.4	6.61
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Sub Total	0.0	0.00
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Miscellaneous

Lights	18.3	50.98
Base Utilities	0.0	0.00
Misc Equipment	0.0	0.00
Sub Total	18.3	50.98

Grand Total	35.9	100.00
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**          T R A C E    6 0 0    A N A L Y S I S          **  
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 45

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Reflectance: 0.20
Winter Ground Reflectance: 0.20

Air Density: 0.0742 (lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 13: 5:27 1/26/94
Dataset Name: CB45 .TM

AIRFLOW - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- S Y S T E M S U M M A R Y -----
(Design Airflow Quantities)

System Number	System Type	----- Main -----					Auxil. Supply	Room Exhaust
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Airflow (Cfm)	Airflow (Cfm)
1	SZ	0	5,519	5,519	6,484	965	0	0
2	PTAC	0	195	195	239	44	0	0
3	RAD	0	0	0	0	1,321	0	0
Totals		0	5,714	5,714	6,724	2,331	0	0

CAPACITY - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- S Y S T E M S U M M A R Y -----
(Design Capacity Quantities)

System Number	System Type	----- Cooling -----					----- Heating -----					
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	SZ	12.5	0.0	0.0	12.5	-155,104	0	0	0	0	0	-155,104
2	PTAC	0.4	0.0	0.0	0.4	-6,656	0	0	0	0	0	-6,656
3	RAD	0.0	0.0	0.0	0.0	-210,231	0	0	0	0	0	-210,231
Totals		12.9	0.0	0.0	12.9	-371,990	0	0	0	0	0	-371,990

The building peaked at hour 16 month 7 with a capacity of 12.9 tons

ENGINEERING CHECKS - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- E N G I N E E R I N G C H E C K S -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	----- Cooling -----				--- Heating ---		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	SZ	0.00	1.11	442.5	397.2	30.21	1.11	-31.31	4,954
2	Main	PTAC	0.00	1.80	455.9	252.8	47.46	1.80	-61.63	108
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-33.94	6,194

System 1 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==> Mo/Hr: 7/16 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 * OADB: 91 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads												
Skylite Solr	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	22,074	0	0	22,074	14.75	*	22,074	19.32	*	-18,158	-18,158	11.71
Glass Solar	17,987	0	0	17,987	12.02	*	17,987	15.74	*	0	0	0.00
Glass Cond	3,619	0	0	3,619	2.42	*	3,619	3.17	*	-17,052	-17,052	10.99
Wall Cond	26,577	0	0	26,577	17.76	*	26,577	23.26	*	-52,660	-52,660	33.95
Partition	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	37,075	0	0	37,075	24.77	*	16,283	14.25	*	-67,233	-67,233	43.35
Sub Total==>	107,331	0	0	107,331	71.71	*	86,540	75.74	*	-155,104	-155,104	100.00
Internal Loads												
Lights	24,283	0	0	24,283	16.22	*	24,283	21.25	*	0	0	0.00
People	20,341	0	0	20,341	13.59	*	9,635	8.43	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	44,624	0	0	44,624	29.81	*	33,918	29.68	*	0	0	0.00
Ceiling Load	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				3,925	2.62	*		0.00	*		0	0.00
Ret. Fan Heat		0	0	0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0	0	0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	-6,197			-6,197	-4.14	*	-6,197	-5.42	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	145,759	0	0	149,683	100.00	*	114,261	100.00	*	-155,104	-155,104	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total Floor	Glass (sf)	(%)
Main Clg	12.5	149.7	118.2	75.0 62.4 66.5	55.3 53.1 58.2	4,954		
Aux Clg	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	0		
Opt Vent	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	12.5	149.7				4,954	0	0
						3,329	473	14

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling cfm	Heating cfm	Clg % OA	0.0	Type	Clg	Htg
Main Htg	-155.1	5,519	68.0	93.8	Vent	0	0	Clg Cfm/Sqft	1.11	SADB	56.0	93.8
Aux Htg	0.0	0	0.0	0.0	Infil	965	965	Clg Cfm/Ton	442.45	Plenum	75.0	68.0
Preheat	-0.0	5,519	68.0	55.3	Supply	5,519	5,519	Clg Sqft/Ton	397.16	Return	75.0	68.0
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	30.21	Ret/OA	75.0	68.0
Humidif	0.0	0	0.0	0.0	Return	5,519	5,519	No. People	42	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.2	0.0
Total	-155.1				Rm Exh	0	0	Htg Cfm/Sqft	1.11	Fn BldTD	0.1	0.0
					Auxil	0	0	Htg Btuh/Sqft	-31.31	Fn Frict	0.4	0.0

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==>					Mo/Hr: 7/14	*	Mo/Hr: 7/16	*	Mo/Hr: 13/ 1			
Outside Air ==>					OADB/WB/HR: 91/ 74/105.0	*	OADB: 91	*	OADB: 4			
						*		*				
	Space	Ret. Air	Ret. Air	Net	Perct	*	Space	Perct	*	Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot	*	Sensible	Of Tot	*	Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	*	(Btuh)	(%)	*	(Btuh)	(Btuh)	(%)
Envelope Loads						*			*			
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	416	0		416	8.11	*	477	11.73	*	-396	-396	5.95
Glass Solar	784	0		784	15.30	*	765	18.82	*	0	0	0.00
Glass Cond	136	0		136	2.65	*	145	3.57	*	-689	-689	10.35
Wall Cond	1,450	0		1,450	28.29	*	1,531	37.66	*	-2,474	-2,474	37.18
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	1,920			1,920	37.46	*	750	18.44	*	-3,096	-3,096	46.52
Sub Total==>	4,706	0		4,706	91.80	*	3,668	90.22	*	-6,656	-6,656	100.00
Internal Loads						*			*			
Lights	379	0		379	7.39	*	398	9.78	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	379	0	0	379	7.39	*	398	9.78	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				42	0.81	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
						*			*			
Grand Total==>	5,084	0	0	5,126	100.00	*	4,066	100.00	*	-6,656	-6,656	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WH/HR Deg F	Entering DB/WH/HR Deg F	Entering DB/WH/HR Grains	Leaving DB/WH/HR Deg F	Leaving DB/WH/HR Deg F	Leaving DB/WH/HR Grains	Gross Total Floor	Glass (sf)	(%)
Main Clg	0.4	5.1	195	75.1	62.5	66.5	55.7	53.5	58.9	108		
Aux Clg	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0		
Opt Vent	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0		
Totals	0.4	5.1								108	19	12

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
Main Htg	-6.7	195	68.0	99.4	Vent	0	0	Clg Cfm/Sqft	1.80	SADB	55.8	99.4
Aux Htg	0.0	0	0.0	0.0	Infil	44	44	Clg Cfm/Ton	455.87	Plenum	75.0	68.0
Preheat	-0.0	195	68.0	55.6	Supply	195	195	Clg Sqft/Ton	252.84	Return	75.0	68.0
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	47.46	Ret/OA	75.0	68.0
Humidif	0.0	0	0.0	0.0	Return	195	195	No. People	0	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-6.7				Rm Exh	0	0	Htg Cfm/SqFt	1.80	Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/SqFt	-61.63	Fn Frict	0.1	0.0

System 3 Block RAD - RADIATION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads						*			*			
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	-22,703	-22,703	10.80
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-23,598	-23,598	11.22
Wall Cond	0	0		0	0.00	*	0	0.00	*	-71,927	-71,927	34.21
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-92,002	-92,002	43.76
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-210,231	-210,231	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-210,231	-210,231	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total Floor	Glass (sf) (%)
Main Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	6,194	
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0	
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0	
Totals	0.0	0.0				6,194	0 0
						4,555	655 14

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F
Main Htg	-210.2	0	0.0	0.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-210.2			

-----AIRFLOWS (cfm)-----

	Type	Cooling	Heating
Vent		0	0
Infil		0	1,321
Supply		0	0
Mincfm		0	0
Return		0	0
Exhaust		0	0
Rm Exh		0	0
Auxil		0	0

-----ENGINEERING CHECKS-----

	Clg % OA	0.0
Clg Cfm/Sqft	0.00	
Clg Cfm/Ton	0.00	
Clg Sqft/Ton	0.00	
Clg Btuh/Sqft	0.00	
No. People	0	
Htg % OA	0.0	
Htg Cfm/Sqft	0.00	
Htg Btuh/Sqft	-33.94	

-----TEMPERATURES (F)-----

	Type	Clg	Htg
SADB	0.0	68.1	
Plenum	0.0	68.0	
Return	0.0	68.0	
Ret/OA	0.0	68.0	
Runarnd	0.0	68.0	
Fn MtrTD	0.0	0.0	
Fn BldTD	0.0	0.0	
Fn Frict	0.0	0.0	

BUILDING U-VALUES - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- B U I L D I N G U - V A L U E S -----

Room Number	Description	Part.	ExFlr	Room U-Values (Btu/hr/sqft/F)							Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
				Summr Skylt	Wintr Skylt	Summr Roof	Wintr Windo	Summr Windo	Wall	Ceil.		
1	OFFICES	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
3	WOMENS TOILET	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
1	OFFICES	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
2	CORRIDOR TOILETS	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	36.7	10.59
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	36.7	10.59
3	WOMENS TOILET	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	32.0	9.63
Building		0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	31.5	9.54

BUILDING AREAS - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- B U I L D I N G A R E A S -----

		Number of		Floor	Total	Partition	Exposed	Skylight	Skl	Net Roof	Window	Win	Net Wall
Room		Duplicate		Area/Dupl	Floor		Floor						
Number	Description	Flr	Rm	Room	Area	Area	Area	Area	/Rf	Area	Area	/Wl	Area
				(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(%)	(sqft)
1	OFFICES	1	1	4,954	4,954	0	0	0	0	4,954	473	14	2,855
Zone	1 Total/Ave.				4,954	0	0	0	0	4,954	473	14	2,855
System	1 Total/Ave.				4,954	0	0	0	0	4,954	473	14	2,855
3	WOMENS TOILET	1	1	108	108	0	0	0	0	108	19	12	134
Zone	3 Total/Ave.				108	0	0	0	0	108	19	12	134
System	2 Total/Ave.				108	0	0	0	0	108	19	12	134
1	OFFICES	1	1	4,954	4,954	0	0	0	0	4,954	473	14	2,855
Zone	1 Total/Ave.				4,954	0	0	0	0	4,954	473	14	2,855
2	CORRIDOR TOILETS	1	1	1,132	1,132	0	0	0	0	1,132	163	15	911
Zone	2 Total/Ave.				1,132	0	0	0	0	1,132	163	15	911
3	WOMENS TOILET	1	1	108	108	0	0	0	0	108	19	12	134
Zone	3 Total/Ave.				108	0	0	0	0	108	19	12	134
System	3 Total/Ave.				6,194	0	0	0	0	6,194	655	14	3,900
Building					11,256	0	0	0	0	11,256	1,148	14	6,890

ASHRAE 90 ANALYSIS - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.057 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.326 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.169 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.49 (Btu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTVw) = 21.38 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.6	3	22	-18,599	18	432	285.7	0	0	0.0	0	0
5 - 10	1.3	3	27	-37,199	22	519	571.4	0	0	0.0	0	0
10 - 15	1.9	5	41	-55,798	17	401	857.1	0	0	0.0	0	0
15 - 20	2.6	5	40	-74,398	11	264	1,142.7	0	0	0.0	0	0
20 - 25	3.2	5	39	-92,997	10	234	1,428.4	0	0	0.0	0	0
25 - 30	3.9	5	44	-111,597	2	37	1,714.1	0	0	0.0	0	0
30 - 35	4.5	13	108	-130,196	0	4	1,999.8	0	0	0.0	0	0
35 - 40	5.2	4	34	-148,796	1	19	2,285.5	0	0	0.0	0	0
40 - 45	5.8	7	58	-167,395	0	0	2,571.2	0	0	0.0	0	0
45 - 50	6.5	9	76	-185,995	0	5	2,856.9	0	0	0.0	0	0
50 - 55	7.1	5	46	-204,594	2	43	3,142.5	0	0	0.0	0	0
55 - 60	7.7	5	43	-223,194	17	400	3,428.2	0	0	0.0	0	0
60 - 65	8.4	8	71	-241,793	0	0	3,713.9	0	0	0.0	0	0
65 - 70	9.0	3	23	-260,393	0	0	3,999.6	0	0	0.0	0	0
70 - 75	9.7	2	20	-278,992	0	0	4,285.3	0	0	0.0	0	0
75 - 80	10.3	7	60	-297,592	0	0	4,571.0	0	0	0.0	0	0
80 - 85	11.0	0	0	-316,191	0	0	4,856.7	0	0	0.0	0	0
85 - 90	11.6	1	9	-334,791	0	0	5,142.4	0	0	0.0	0	0
90 - 95	12.3	2	19	-353,390	0	0	5,428.0	0	0	0.0	0	0
95 - 100	12.9	7	58	-371,990	0	0	5,713.7	100	1,070	0.0	0	0
Hours Off	0.0	0	7,922	0	0	6,402	0.0	0	7,690	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 3
 WEATHERSTRIP & CAULKING

----- B U I L D I N G T E M P E R A T U R E P R O F I L E S -----

Temperature Range (F)	----- Zone Number -----				
	1	3	1	2	3
Max. Temp.	88.4	89.2	106.6	103.9	102.5
Mo./Hr.	7 21	7 20	7 20	7 22	8 20
Day Type	4	4	2	1	1

	..... Number of Hours				
Above 100	0	0	902	262	94
95 - 100	0	0	774	940	760
90 - 95	0	0	904	998	1,254
85 - 90	188	168	603	742	835
80 - 85	1,455	1,253	469	654	653
75 - 80	1,754	1,809	20	76	76
70 - 75	479	493	536	226	298
65 - 70	525	535	1,770	1,977	1,991
60 - 65	759	876	977	1,000	917
55 - 60	607	742	734	758	776
50 - 55	701	681	1,071	1,127	1,106
Below 50	2,292	2,203	0	0	0

Min. Temp.	33.5	34.1	54.9	54.9	54.9
Mo./Hr.	2 11	2 10	12 21	3 7	1 4
Day Type	4	4	3	4	2

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	HOT WTR On Peak (Therm)	HOT W DMND On Peak (Thrm/hr)
Jan	3,519	18	461	2
Feb	3,184	18	436	2
March	3,852	18	220	2
April	3,349	18	42	2
May	4,779	39	0	0
June	5,974	40	0	0
July	6,440	41	0	0
Aug	6,220	40	0	0
Sept	4,312	39	0	0
Oct	3,684	18	38	2
Nov	3,350	18	161	2
Dec	3,351	18	376	2
Total	52,014	41	1,734	2

Building Energy Consumption = 31,178 (Stu/Sq Ft/Year)
Source Energy Consumption = 67,862 (8tu/Sq Ft/Year)

Floor Area = 11,256 (Sq Ft)

----- EQUIPMENT ENERGY CONSUMPTION -----

Ref Num	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	3516	3181	3851	3349	3684	3684	3349	3851	3349	3684	3349	3349	42,193
	PK	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3
1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTW20	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1161	AIR-CLD COND COMP <15 TONS												
	ELEC	0	0	0	0	481	1490	2216	1523	403	0	0	0	6,114
	PK	0.0	0.0	0.0	0.0	16.0	16.7	17.3	16.8	16.1	0.0	0.0	0.0	17.3
1	EQ5200	CONDENSER FANS												
	ELEC	0	0	0	0	48	134	214	140	42	0	0	0	578
	PK	0.0	0.0	0.0	0.0	1.3	1.4	1.6	1.4	1.1	0.0	0.0	0.0	1.6
1	EQ5303	CONTROLS												
	ELEC	0	0	0	0	35	66	60	69	22	0	0	0	251
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
2	EQ1161	AIR-CLD COND COMP <15 TONS												
	ELEC	0	0	0	0	1	27	59	36	7	0	0	0	129
	PK	0.0	0.0	0.0	0.0	0.5	0.5	0.6	0.5	0.5	0.0	0.0	0.0	0.6
2	EQ5200	CONDENSER FANS												
	ELEC	0	0	0	0	0	3	6	3	1	0	0	0	13
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1
2	EQ5303	CONTROLS												

[illegible]

UTILITY PEAK CHECKSUMS - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 40.8 (kW)
Yearly Time of Peak 15 (hr) 7 (mo)

Hour 15 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Perct Of Tot (%)
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Cooling Equipment

1	EQ1161	AIR-CLD COND COMP <15 TONS	19.2	47.01
2	EQ1161	AIR-CLD COND COMP <15 TONS	0.9	2.23

Sub Total			20.1	49.25
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Sub Total			0.0	0.00
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Air Moving Equipment

1		SUMMATION OF FAN ELECTRICAL DEMAND	2.4	5.80
2		SUMMATION OF FAN ELECTRICAL DEMAND	0.0	0.06

Sub Total			2.4	5.86
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Sub Total			0.0	0.00
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Miscellaneous

Lights			18.3	44.89
Base Utilities			0.0	0.00
Misc Equipment			0.0	0.00
Sub Total			18.3	44.89

Grand Total			40.8	100.00
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**          T R A C E    6 0 0    A N A L Y S I S          **  
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 45

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Reflectance: 0.20
Winter Ground Reflectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (8tu/lbm/F)
Density-Specific Heat Prod: 1.0882 (8tu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (8tu-min./hr/cuft)
Enthalpy Factor: 4.4519 (lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 13:16:58 1/26/94
Dataset Name: CB45 .TM

AIRFLOW - ALTERNATIVE 4
REPLACE FLUORESCENT LAMPS

----- S Y S T E M S U M M A R Y -----
(Design Airflow Quantities)

System Number	System Type	Main					Auxil. Supply Airflow (Cfm)	Room Exhaust Airflow (Cfm)
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)		
1	SZ	0	5,519	5,519	6,717	1,198	0	0
2	PTAC	0	184	184	239	55	0	0
3	RAD	0	0	0	0	1,640	0	0
Totals		0	5,703	5,703	6,956	2,893	0	0

CAPACITY - ALTERNATIVE 4
REPLACE FLUORESCENT LAMPS

----- S Y S T E M S U M M A R Y -----
(Design Capacity Quantities)

System Number	System Type	Cooling				Heating						
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	SZ	13.4	0.0	0.0	13.4	-171,332	0	0	0	0	0	-171,332
2	PTAC	0.5	0.0	0.0	0.5	-7,403	0	0	0	0	0	-7,403
3	RAD	0.0	0.0	0.0	0.0	-232,438	0	0	0	0	0	-232,438
Totals		13.8	0.0	0.0	13.8	-411,173	0	0	0	0	0	-411,173

The building peaked at hour 16 month 7 with a capacity of 13.8 tons

ENGINEERING CHECKS - ALTERNATIVE 4
REPLACE FLUORESCENT LAMPS

----- E N G I N E E R I N G C H E C K S -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	Cooling				Heating		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	SZ	0.00	1.11	412.2	370.0	32.43	1.11	-34.58	4,954
2	Main	PTAC	0.00	1.70	405.1	238.2	50.38	1.70	-68.55	108
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-37.53	6,194

System 1 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/16 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 * OADB: 91 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Percent Of Tot (%)	*	Space Sensible (Btuh)	Percent Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Percent Of Tot (%)
Envelope Loads						*			*			
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	22,074	0		22,074	13.74	*	22,074	18.36	*	-18,158	-18,158	10.60
Glass Solar	17,987	0		17,987	11.20	*	17,987	14.96	*	0	0	0.00
Glass Cond	3,619	0		3,619	2.25	*	3,619	3.01	*	-17,052	-17,052	9.95
Wall Cond	26,577	0		26,577	16.54	*	26,577	22.11	*	-52,660	-52,660	30.74
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	46,024			46,024	28.65	*	20,213	16.81	*	-83,461	-83,461	48.71
Sub Total==>	116,280	0		116,280	72.38	*	90,470	75.26	*	-171,332	-171,332	100.00
Internal Loads						*			*			
Lights	21,230	0		21,230	13.21	*	21,230	17.66	*	0	0	0.00
People	20,341			20,341	12.66	*	9,635	8.02	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	41,570	0	0	41,570	25.88	*	30,865	25.68	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				3,925	2.44	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	-1,124			-1,124	-0.70	*	-1,124	-0.93	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	156,727	0	0	160,652	100.00	*	120,211	100.00	*	-171,332	-171,332	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf) (%)	
				Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor	4,954	
Main Clg	13.4	160.7	124.1	75.0	62.4	66.5	54.3	52.4	56.9	Part	0	
Aux Clg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0	
Opt Vent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	4,954	0 0
Totals	13.4	160.7								Wall	3,329	473 14

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	--ENGINEERING CHECKS--		--TEMPERATURES (F)--		
					Vent	0	0	Clg % OA	0.0	Type	Clg	Htg
Main Htg	-171.3	5,519	68.0	96.5	Infil	1,198	1,198	Clg Cfm/Sqft	1.11	SADB	55.0	96.5
Aux Htg	0.0	0	0.0	0.0	Supply	5,519	5,519	Clg Cfm/Ton	412.25	Plenum	75.0	68.0
Preheat	-0.0	5,519	68.0	54.3	Mincfm	0	0	Clg Sqft/Ton	370.04	Return	75.0	68.0
Reheat	0.0	0	0.0	0.0	Return	5,519	5,519	Clg Btuh/Sqft	32.43	Ret/OA	75.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	No. People	42	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg % OA	0.0	Fn MtrTD	0.2	0.0
Total	-171.3				Auxil	0	0	Htg Cfm/Sqft	1.11	Fn BldTD	0.1	0.0
								Htg Btuh/Sqft	-34.58	Fn Frict	0.4	0.0

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	416	0		416	7.64	*	477	11.65	*	-396	-396	5.35
Glass Solar	784	0		784	14.41	*	765	18.69	*	0	0	0.00
Glass Cond	136	0		136	2.49	*	145	3.55	*	-689	-689	9.31
Wall Cond	1,450	0		1,450	26.65	*	1,531	37.40	*	-2,474	-2,474	33.43
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	2,384			2,384	43.81	*	931	22.74	*	-3,844	-3,844	51.92
Sub Total==>	5,169	0		5,169	95.00	*	3,849	94.02	*	-7,403	-7,403	100.00
Internal Loads						*			*			
Lights	233	0		233	4.28	*	245	5.98	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	233	0	0	233	4.28	*	245	5.98	*	0	0	0.00
Ceiling Load	0			0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				39	0.72	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkwp		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	5,402	0	0	5,441	100.00	*	4,094	100.00	*	-7,403	-7,403	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf) (%)	
	(Tons)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor	108	
Main Clg	0.5	5.4	184	75.1	62.5	66.5	54.4	52.2	56.2	Part	0	
Aux Clg	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0	
Opt Vent	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	108	0 0
Totals	0.5	5.4								Wall	153	19 12

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	--ENGINEERING CHECKS--		--TEMPERATURES (F)---		
	(Mbh)	(cfm)	Deg F	Deg F	Vent			Clg % OA	0.0	Type	Clg	Htg
Main Htg	-7.4	184	68.0	105.0	Infil	55	55	Clg Cfm/Sqft	1.70	SADB	54.5	105.0
Aux Htg	0.0	0	0.0	0.0	Supply	184	184	Clg Cfm/Ton	405.08	Plenum	75.0	68.0
Preheat	-0.0	184	68.0	54.3	Mincfm	0	0	Clg Sqft/Ton	238.18	Return	75.0	68.0
Reheat	0.0	0	0.0	0.0	Return	184	184	Clg Btuh/Sqft	50.38	Ret/OA	75.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	No. People	0	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-7.4				Auxil	0	0	Htg Cfm/Sqft	1.70	Fn BldTD	0.0	0.0
								Htg Btuh/Sqft	-68.55	Fn Frict	0.1	0.0

System 3 Block RAD - RADIATION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Percent		Space	Percent		Space Peak	Coil Peak	Percent
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	-22,703	-22,703	9.77
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-23,598	-23,598	10.15
Wall Cond	0	0		0	0.00	*	0	0.00	*	-71,927	-71,927	30.94
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-114,210	-114,210	49.14
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-232,438	-232,438	100.00
Internal Loads												
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-232,438	-232,438	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf) (%)	
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor	
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	6,194
Totals	0.0	0.0									Wall	4,555

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	--ENGINEERING CHECKS--		--TEMPERATURES (F)--		
	(Mbh)	(cfm)	Deg F	Deg F	Vent			Clg % OA	0.0	Type	Clg	Htg
Main Htg	-232.4	0	0.0	0.0	Infil	0	1,640	Clg Cfm/Sqft	0.00	SADB	0.0	68.1
Aux Htg	0.0	0	0.0	0.0	Supply	0	0	Clg Cfm/Ton	0.00	Plenum	0.0	68.0
Preheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Sqft/Ton	0.00	Return	0.0	68.0
Reheat	0.0	0	0.0	0.0	Return	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	No. People	0	Runarnd	0.0	68.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-232.4				Auxil	0	0	Htg Cfm/Sqft	0.00	Fn BldTD	0.0	0.0
								Htg Btuh/Sqft	-37.53	Fn Frict	0.0	0.0

BUILDING U-VALUES - ALTERNATIVE 4
REPLACE FLUORESCENT LAMPS

----- B U I L D I N G U - V A L U E S -----

		Room U-Values									Room	Room
		(Btu/hr/sqft/F)									Mass	Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	OFFICES	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
3	WOMENS TOILET	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
1	OFFICES	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
	2 CORRIDOR TOILETS	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	36.7	10.59
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	36.7	10.59
	3 WOMENS TOILET	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	32.0	9.63
Building		0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	31.5	9.54

BUILDING AREAS - ALTERNATIVE 4
REPLACE FLUORESCENT LAMPS

----- B U I L D I N G A R E A S -----

Room Number	Description	Number of		Floor	Total	Partition Area (sqft)	Exposed	Skylight Area (sqft)	Skf /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
		Duplicate Flr	Rm	Area/Dupl Room (sqft)	Floor Area (sqft)		Floor Area (sqft)						
1	OFFICES	1	1	4,954	4,954	0	0	0	0	4,954	473	14	2,855
Zone	1 Total/Ave.				4,954	0	0	0	0	4,954	473	14	2,855
System	1 Total/Ave.				4,954	0	0	0	0	4,954	473	14	2,855
3	WOMENS TOILET	1	1	108	108	0	0	0	0	108	19	12	134
Zone	3 Total/Ave.				108	0	0	0	0	108	19	12	134
System	2 Total/Ave.				108	0	0	0	0	108	19	12	134
1	OFFICES	1	1	4,954	4,954	0	0	0	0	4,954	473	14	2,855
Zone	1 Total/Ave.				4,954	0	0	0	0	4,954	473	14	2,855
2	CORRIDOR TOILETS	1	1	1,132	1,132	0	0	0	0	1,132	163	15	911
Zone	2 Total/Ave.				1,132	0	0	0	0	1,132	163	15	911
3	WOMENS TOILET	1	1	108	108	0	0	0	0	108	19	12	134
Zone	3 Total/Ave.				108	0	0	0	0	108	19	12	134
System	3 Total/Ave.				6,194	0	0	0	0	6,194	655	14	3,900
Building					11,256	0	0	0	0	11,256	1,148	14	6,890

ASHRAE 90 ANALYSIS - ALTERNATIVE 4
REPLACE FLUORESCENT LAMPS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.057 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.326 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.169 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.49 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTVw) = 21.38 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 4
REPLACE FLUORESCENT LAMPS

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.7	6	45	-20,559	14	344	285.1	0	0	0.0	0	0
5 - 10	1.4	3	23	-41,117	21	518	570.3	0	0	0.0	0	0
10 - 15	2.1	3	26	-61,676	20	497	855.4	0	0	0.0	0	0
15 - 20	2.8	2	16	-82,235	12	307	1,140.5	0	0	0.0	0	0
20 - 25	3.5	8	64	-102,793	13	322	1,425.7	0	0	0.0	0	0
25 - 30	4.2	11	85	-123,352	1	35	1,710.6	0	0	0.0	0	0
30 - 35	4.8	6	45	-143,911	0	0	1,995.9	0	0	0.0	0	0
35 - 40	5.5	4	34	-164,469	1	16	2,281.1	0	0	0.0	0	0
40 - 45	6.2	11	86	-185,028	1	20	2,566.2	0	0	0.0	0	0
45 - 50	6.9	3	22	-205,587	0	5	2,851.3	0	0	0.0	0	0
50 - 55	7.6	9	67	-226,145	1	29	3,136.5	0	0	0.0	0	0
55 - 60	8.3	9	67	-246,704	16	394	3,421.6	0	0	0.0	0	0
60 - 65	9.0	3	23	-267,263	0	0	3,706.7	0	0	0.0	0	0
65 - 70	9.7	5	39	-287,821	0	0	3,991.9	0	0	0.0	0	0
70 - 75	10.4	5	40	-308,380	0	0	4,277.0	0	0	0.0	0	0
75 - 80	11.1	3	20	-328,939	0	0	4,562.1	0	0	0.0	0	0
80 - 85	11.8	4	33	-349,497	0	0	4,847.3	0	0	0.0	0	0
85 - 90	12.5	0	0	-370,056	0	0	5,132.4	0	0	0.0	0	0
90 - 95	13.1	0	0	-390,615	0	0	5,417.5	0	0	0.0	0	0
95 - 100	13.6	3	25	-411,173	0	0	5,702.7	100	1,070	0.0	0	0
Hours Off	0.0	0	8,000	0	0	6,273	0.0	0	7,690	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 4
 REPLACE FLUORESCENT LAMPS

----- B U I L D I N G T E M P E R A T U R E P R O F I L E S -----

Temperature	----- Zone Number -----				
Range (F)	1	3	1	2	3
Max. Temp.	87.9	88.6	105.7	103.4	101.3
Mo./Hr.	7 21	7 20	7 22	7 22	8 20
Day Type	4	4	1	1	1

	..... Number of Hours				
Above 100	0	0	668	223	0
95 - 100	0	0	895	900	694
90 - 95	0	0	884	1,001	1,276
85 - 90	156	147	656	766	803
80 - 85	1,309	1,127	549	682	740
75 - 80	1,878	1,805	20	100	159
70 - 75	363	591	308	132	188
65 - 70	587	348	1,867	2,010	1,940
60 - 65	575	772	979	981	888
55 - 60	771	807	764	736	852
50 - 55	686	727	1,170	1,229	1,220
Below 50	2,435	2,436	0	0	0

Min. Temp.	32.6	33.1	54.9	55.0	54.9
Mo./Hr.	2 10	2 10	3 7	1 7	2 20
Day Type	4	4	5	1	3

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 4
REPLACE FLUORESCENT LAMPS

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	HOT WTR On Peak (Therm)	HOT W DMND On Peak (Thrm/hr)
Jan	3,064	16	527	2
Feb	2,772	16	505	2
March	3,354	16	268	2
April	2,916	16	67	2
May	4,092	37	0	0
June	5,331	39	0	0
July	5,961	40	0	0
Aug	5,574	39	0	0
Sept	3,707	38	0	0
Oct	3,207	16	59	2
Nov	2,916	16	191	2
Dec	2,918	16	430	2
Total	45,813	40	2,046	2

Building Energy Consumption = 32,069 (Btu/Sq Ft/Year)
Source Energy Consumption = 65,915 (Btu/Sq Ft/Year)

Floor Area = 11,256 (Sq Ft)

----- EQUIPMENT ENERGY CONSUMPTION -----

[illegible]

[illegible]

UTILITY PEAK CHECKSUMS - ALTERNATIVE 4
REPLACE FLUORESCENT LAMPS

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 39.7 (kW)
Yearly Time of Peak 15 (hr) 7 (mo)

Hour 15 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Perct Of Tot (%)
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Cooling Equipment

1	EQ1161	AIR-CLD COND COMP <15 TONS	20.5	51.56
2	EQ1161	AIR-CLD COND COMP <15 TONS	0.9	2.33

Sub Total			21.4	53.89
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Sub Total			0.0	0.00
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Air Moving Equipment

1		SUMMATION OF FAN ELECTRICAL DEMAND	2.4	5.95
2		SUMMATION OF FAN ELECTRICAL DEMAND	0.0	0.06

Sub Total			2.4	6.01
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Sub Total			0.0	0.00
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Miscellaneous

Lights			15.9	40.10
Base Utilities			0.0	0.00
Misc Equipment			0.0	0.00
Sub Total			15.9	40.10

Grand Total			39.7	100.00
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**          T R A C E   6 0 0   A N A L Y S I S          **  
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 45

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Reflectance: 0.20
Winter Ground Reflectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)
Density-Specific Heat Prod: 1.0882 (8tu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 14: 9:28 1/26/94
Dataset Name: CB45B .TM

AIRFLOW - ALTERNATIVE 1
REPLACE FLUORESCENT BALLASTS

----- S Y S T E M S U M M A R Y -----

(Design Airflow Quantities)

System Number	System Type	Main					Auxil.	Room
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	SZ	0	5,519	5,519	6,717	1,198	0	0
2	PTAC	0	181	181	236	55	0	0
3	RAD	0	0	0	0	1,640	0	0
Totals		0	5,700	5,700	6,954	2,893	0	0

CAPACITY - ALTERNATIVE 1
REPLACE FLUORESCENT BALLASTS

----- S Y S T E M S U M M A R Y -----

(Design Capacity Quantities)

System Number	System Type	Cooling					Heating					
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	SZ	13.1	0.0	0.0	13.1	-171,332	0	0	0	0	0	-171,332
2	PTAC	0.4	0.0	0.0	0.4	-7,403	0	0	0	0	0	-7,403
3	RAD	0.0	0.0	0.0	0.0	-232,438	0	0	0	0	0	-232,438
Totals		13.6	0.0	0.0	13.6	-411,173	0	0	0	0	0	-411,173

The building peaked at hour 16 month 7 with a capacity of 13.6 tons

ENGINEERING CHECKS - ALTERNATIVE 1
REPLACE FLUORESCENT BALLASTS

----- E N G I N E E R I N G C H E C K S -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	Cooling				Heating		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	SZ	0.00	1.11	420.4	377.4	31.80	1.11	-34.58	4,954
2	Main	PTAC	0.00	1.68	402.7	240.3	49.93	1.68	-68.55	108
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-37.53	6,194

System 1 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/16 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	22,074	0		22,074	14.01	*	22,074	18.68	*	-18,158	-18,158	10.60
Glass Solar	17,987	0		17,987	11.42	*	17,987	15.23	*	0	0	0.00
Glass Cond	3,619	0		3,619	2.30	*	3,619	3.06	*	-17,052	-17,052	9.95
Wall Cond	26,577	0		26,577	16.87	*	26,577	22.50	*	-52,660	-52,660	30.74
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	44,969			44,969	28.55	*	20,213	17.11	*	-83,461	-83,461	48.71
Sub Total==>	115,226	0		115,226	73.15	*	90,470	76.58	*	-171,332	-171,332	100.00
Internal Loads												
Lights	18,031	0		18,031	11.45	*	18,031	15.26	*	0	0	0.00
People	20,341			20,341	12.91	*	9,635	8.16	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	38,371	0	0	38,371	24.36	*	27,666	23.42	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				3,925	2.49	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	153,597	0	0	157,522	100.00	*	118,136	100.00	*	-171,332	-171,332	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	13.1	157.5	122.1	75.0 62.7 67.8	54.7 52.9 58.5	Part	4,954	
Aux Clg	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	0	
Opt Vent	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	Roof	4,954	0 0
Totals	13.1	157.5				Wall	3,329	473 14

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	--ENGINEERING CHECKS--	--TEMPERATURES (F)--
	(Mbh)	(cfm)	Deg F	Deg F	Vent			Clg % OA	Type Clg Htg
Main Htg	-171.3	5,519	68.0	96.5	Infil	1,198	1,198	Clg Cfm/Sqft	1.11 SADB 55.3 96.5
Aux Htg	0.0	0	0.0	0.0	Supply	5,519	5,519	Clg Cfm/Ton	420.44 Plenum 75.0 68.0
Preheat	-0.0	5,519	68.0	54.7	Mincfm	0	0	Clg Btuh/Sqft	31.80 Return 75.0 68.0
Reheat	0.0	0	0.0	0.0	Return	5,519	5,519	No. People	42 Runarnd 75.0 68.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0 Fn MtrTD 0.2 0.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	1.11 Fn BldTD 0.1 0.0
Total	-171.3				Auxil	0	0	Htg Btuh/Sqft	-34.58 Fn Frict 0.4 0.0

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads						*			*			
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	416	0		416	7.71	*	477	11.75	*	-396	-396	5.35
Glass Solar	784	0		784	14.54	*	765	18.86	*	0	0	0.00
Glass Cond	136	0		136	2.52	*	145	3.58	*	-689	-689	9.31
Wall Cond	1,450	0		1,450	26.88	*	1,531	37.74	*	-2,474	-2,474	33.43
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	2,384			2,384	44.20	*	931	22.94	*	-3,844	-3,844	51.92
Sub Total==>	5,169	0		5,169	95.85	*	3,849	94.87	*	-7,403	-7,403	100.00
Internal Loads						*			*			
Lights	198	0		198	3.67	*	208	5.13	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	198	0	0	198	3.67	*	208	5.13	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				26	0.48	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	5,367	0	0	5,393	100.00	*	4,057	100.00	*	-7,403	-7,403	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total	Glass (sf)	(%)
Main Clg	0.4	5.4	3.9	181 75.1 62.5 66.5	54.3 52.1 56.0	Floor	108	
Aux Clg	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	Part	0	
Opt Vent	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	0	
Totals	0.4	5.4				Roof	108	0 0
						Wall	153	19 12

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
Main Htg	-7.4	181	68.0	105.6	Vent	0	0	Clg Cfm/Sqft	1.68	SADB	54.4	105.6
Aux Htg	0.0	0	0.0	0.0	Infil	55	55	Clg Cfm/Ton	402.68	Plenum	75.0	68.0
Preheat	-0.0	181	68.0	54.3	Supply	181	181	Clg Sqft/Ton	240.31	Return	75.0	68.0
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	49.93	Ret/OA	75.0	68.0
Humidif	0.0	0	0.0	0.0	Return	181	181	No. People	0	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-7.4				Rm Exh	0	0	Htg Cfm/Sqft	1.68	Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/Sqft	-68.55	Fn Frict	0.1	0.0

System 3 Block RAD - RADIATION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Percent Of Tot (%)	*	Space Sensible (Btuh)	Percent Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Percent Of Tot (%)
Envelope Loads						*			*			
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	-22,703	-22,703	9.77
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-23,598	-23,598	10.15
Wall Cond	0	0		0	0.00	*	0	0.00	*	-71,927	-71,927	30.94
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-114,210	-114,210	49.14
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-232,438	-232,438	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-232,438	-232,438	100.00

-----COOLING COIL SELECTION-----										-----AREAS-----		
	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
				Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor	6,194	
Main Clg	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	0	
Aux Clg	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0	
Opt Vent	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	6,194	0 0
Totals	0.0	0.0								Wall	4,555	655 14

-----HEATING COIL SELECTION-----					-----AIRFLOWS (cfm)-----			--ENGINEERING CHECKS--		--TEMPERATURES (F)---		
	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F								
					Vent	0	0	Clg Cfm/Sqft	0.00	SAOB	0.0	68.1
Main Htg	-232.4	0	0.0	0.0	Infil	0	1,640	Clg Cfm/Ton	0.00	Plenum	0.0	68.0
Aux Htg	0.0	0	0.0	0.0	Supply	0	0	Clg Sqft/Ton	0.00	Return	0.0	68.0
Preheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	68.0
Reheat	0.0	0	0.0	0.0	Return	0	0	No. People	0	Runarnd	0.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	0.00	Fn BldTD	0.0	0.0
Total	-232.4				Auxil	0	0	Htg Btuh/Sqft	-37.53	Fn Frict	0.0	0.0

BUILDING U-VALUES - ALTERNATIVE 1
REPLACE FLUORESCENT BALLASTS

----- B U I L D I N G U - V A L U E S -----

		Room U-Values									Room	Room
		(Btu/hr/sqft/F)									Mass	Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	OFFICES	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
3	WOMENS TOILET	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
1	OFFICES	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
	2 CORRIDOR TOILETS	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	36.7	10.59
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	36.7	10.59
	3 WOMENS TOILET	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	32.0	9.63
Building		0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	31.5	9.54

BUILDING AREAS - ALTERNATIVE 1
REPLACE FLUORESCENT BALLASTS

----- B U I L D I N G A R E A S -----

Room Number	Description	Number of Duplicate		Floor Area/Dupl Room	Total Floor Area	Partition Area	Exposed Floor Area	Skylight Area	Skl /Rf	Net Roof Area	Window Area	Win /Wl	Net Wall Area
		Flr	Rm	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(%)	(sqft)
1	OFFICES	1	1	4,954	4,954	0	0	0	0	4,954	473	14	2,855
Zone	1 Total/Ave.				4,954	0	0	0	0	4,954	473	14	2,855
System	1 Total/Ave.				4,954	0	0	0	0	4,954	473	14	2,855
3	WOMENS TOILET	1	1	108	108	0	0	0	0	108	19	12	134
Zone	3 Total/Ave.				108	0	0	0	0	108	19	12	134
System	2 Total/Ave.				108	0	0	0	0	108	19	12	134
1	OFFICES	1	1	4,954	4,954	0	0	0	0	4,954	473	14	2,855
Zone	1 Total/Ave.				4,954	0	0	0	0	4,954	473	14	2,855
2	CORRIDOR TOILETS	1	1	1,132	1,132	0	0	0	0	1,132	163	15	911
Zone	2 Total/Ave.				1,132	0	0	0	0	1,132	163	15	911
3	WOMENS TOILET	1	1	108	108	0	0	0	0	108	19	12	134
Zone	3 Total/Ave.				108	0	0	0	0	108	19	12	134
System	3 Total/Ave.				6,194	0	0	0	0	6,194	655	14	3,900
Building					11,256	0	0	0	0	11,256	1,148	14	6,890

ASHRAE 90 ANALYSIS - ALTERNATIVE 1
REPLACE FLUORESCENT BALLASTS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.057 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.326 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.169 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTvr) = 3.49 (Btu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTvw) = 21.38 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1
REPLACE FLUORESCENT BALLAST

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			----- Heating Airflow -----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.7	3	23	-20,559	15	364	285.0	0	0	0.0	0	0
5 - 10	1.4	6	45	-41,117	17	434	570.0	0	0	0.0	0	0
10 - 15	2.0	3	22	-61,676	21	539	855.0	0	0	0.0	0	0
15 - 20	2.7	6	45	-82,235	14	349	1,140.0	0	0	0.0	0	0
20 - 25	3.4	2	15	-102,793	12	299	1,425.0	0	0	0.0	0	0
25 - 30	4.1	13	90	-123,352	1	23	1,710.0	0	0	0.0	0	0
30 - 35	4.8	3	22	-143,911	1	35	1,995.0	0	0	0.0	0	0
35 - 40	5.4	8	55	-164,469	0	0	2,280.0	0	0	0.0	0	0
40 - 45	6.1	9	65	-185,028	1	36	2,565.0	0	0	0.0	0	0
45 - 50	6.8	3	22	-205,587	0	5	2,850.0	0	0	0.0	0	0
50 - 55	7.5	12	89	-226,145	1	29	3,135.0	0	0	0.0	0	0
55 - 60	8.1	6	45	-246,704	16	394	3,420.0	0	0	0.0	0	0
60 - 65	8.8	6	42	-267,263	0	0	3,705.0	0	0	0.0	0	0
65 - 70	9.5	3	20	-287,821	0	0	3,990.0	0	0	0.0	0	0
70 - 75	10.2	8	60	-308,380	0	0	4,275.0	0	0	0.0	0	0
75 - 80	10.9	0	0	-328,939	0	0	4,560.0	0	0	0.0	0	0
80 - 85	11.5	5	33	-349,497	0	0	4,845.0	0	0	0.0	0	0
85 - 90	12.2	0	0	-370,056	0	0	5,130.0	0	0	0.0	0	0
90 - 95	12.9	0	0	-390,615	0	0	5,415.0	0	0	0.0	0	0
95 - 100	13.6	3	25	-411,173	0	0	5,700.0	100	1,070	0.0	0	0
Hours Off	0.0	0	8,042	0	0	6,253	0.0	0	7,690	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1
 REPLACE FLUORESCENT BALLAST

----- B U I L D I N G T E M P E R A T U R E P R O F I L E S -----

Temperature Range (F)	----- Zone Number -----				
	1	3	1	2	3
Max. Temp.	87.9	88.6	104.8	102.9	101.1
Mo./Hr.	7 21	7 20	7 21	7 22	8 21
Day Type	4	4	1	1	1

	..... Number of Hours				
Above 100	0	0	471	169	0
95 - 100	0	0	977	871	648
90 - 95	0	0	894	1,028	1,258
85 - 90	151	132	662	761	849
80 - 85	1,268	1,115	625	731	718
75 - 80	1,916	1,824	43	112	199
70 - 75	371	578	193	66	166
65 - 70	530	352	1,961	2,076	1,946
60 - 65	606	785	973	925	904
55 - 60	709	811	774	792	852
50 - 55	660	687	1,187	1,229	1,220
Below 50	2,549	2,476	0	0	0

Min. Temp.	32.5	33.1	54.9	55.0	54.9
Mo./Hr.	2 10	2 10	12 2	1 7	2 20
Day Type	4	4	4	1	3

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1
REPLACE FLUORESCENT BALLASTS

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	HOT WTR	HOT W DMND
	Off Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	2,603	14	534	2
Feb	2,355	14	512	2
March	2,849	14	275	2
April	2,477	14	73	2
May	3,541	34	0	0
June	4,749	36	0	0
July	5,437	37	0	0
Aug	4,965	36	0	0
Sept	3,198	35	0	0
Oct	2,724	14	67	2
Nov	2,477	14	197	2
Dec	2,479	14	437	2
Total	39,855	37	2,096	2

Building Energy Consumption = 30,702 (Btu/Sq Ft/Year)
Source Energy Consumption = 61,080 (Btu/Sq Ft/Year)

Floor Area = 11,256 (Sq Ft)

----- EQUIPMENT ENERGY CONSUMPTION -----

Ref Num	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	2600	2352	2848	2476	2724	2724	2476	2848	2476	2724	2476	2476	31,199
	PK	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH2O	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1161	AIR-CLD COND COMP <15 TONS												
	ELEC	0	0	0	0	250	1273	2102	1312	208	0	0	0	5,146
	PK	0.0	0.0	0.0	0.0	16.8	17.6	18.2	17.6	17.0	0.0	0.0	0.0	18.2
1	EQ5200	CONDENSER FANS												
	ELEC	0	0	0	0	26	117	203	123	22	0	0	0	491
	PK	0.0	0.0	0.0	0.0	0.6	1.4	1.6	1.4	1.1	0.0	0.0	0.0	1.6
1	EQ5303	CONTROLS												
	ELEC	0	0	0	0	17	59	60	62	10	0	0	0	209
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
2	EQ1161	AIR-CLD COND COMP <15 TONS												
	ELEC	0	0	0	0	0	19	55	29	2	0	0	0	105
	PK	0.0	0.0	0.0	0.0	0.5	0.5	0.6	0.5	0.5	0.0	0.0	0.0	0.6
2	EQ5200	CONDENSER FANS												
	ELEC	0	0	0	0	0	2	5	3	0	0	0	0	10
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1
2	EQ5303	CONTROLS												

[illegible]

UTILITY PEAK CHECKSUMS - ALTERNATIVE 1
REPLACE FLUORESCENT BALLASTS

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 36.9 (kW)
Yearly Time of Peak 15 (hr) 7 (mo)

Hour 15 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Perct Of Tot (%)
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Cooling Equipment

1	EQ1161	AIR-CLD COND COMP <15 TONS	20.1	54.41
2	EQ1161	AIR-CLD COND COMP <15 TONS	0.9	2.49

Sub Total			21.0	56.90
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Sub Total			0.0	0.00
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Air Moving Equipment

1		SUMMATION OF FAN ELECTRICAL DEMAND	2.4	6.40
2		SUMMATION OF FAN ELECTRICAL DEMAND	0.0	0.04

Sub Total			2.4	6.44
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Sub Total			0.0	0.00
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Miscellaneous

Lights			13.5	36.66
Base Utilities			0.0	0.00
Misc Equipment			0.0	0.00
Sub Total			13.5	36.66

Grand Total			36.9	100.00
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**          T R A C E    6 0 0    A N A L Y S I S          **  
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 45

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Reflectance: 0.20
Winter Ground Reflectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 14:20:59 1/26/94
Dataset Name: CB458 .TM

AIRFLOW - ALTERNATIVE 2
REPLACE FLUORESCENT FIXTURES

----- S Y S T E M S U M M A R Y -----
(Design Airflow Quantities)

System Number	System Type	Main					Auxil. Supply	Room Exhaust
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Airflow (Cfm)	Airflow (Cfm)
1	SZ	0	5,519	5,519	6,717	1,198	0	0
2	PTAC	0	179	179	234	55	0	0
3	RAD	0	0	0	0	1,640	0	0
Totals		0	5,698	5,698	6,951	2,893	0	0

CAPACITY - ALTERNATIVE 2
REPLACE FLUORESCENT FIXTURES

----- S Y S T E M S U M M A R Y -----
(Design Capacity Quantities)

System Number	System Type	Cooling					Heating					
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	SZ	12.8	0.0	0.0	12.8	-171,332	0	0	0	0	0	-171,332
2	PTAC	0.4	0.0	0.0	0.4	-7,403	0	0	0	0	0	-7,403
3	RAD	0.0	0.0	0.0	0.0	-232,438	0	0	0	0	0	-232,438
Totals		13.2	0.0	0.0	13.2	-411,173	0	0	0	0	0	-411,173

The building peaked at hour 16 month 7 with a capacity of 13.2 tons

ENGINEERING CHECKS - ALTERNATIVE 2
REPLACE FLUORESCENT FIXTURES

----- E N G I N E E R I N G C H E C K S -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	Cooling				Heating		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	SZ	0.00	1.11	431.1	387.0	31.01	1.11	-34.58	4,954
2	Main	PTAC	0.00	1.65	400.3	241.9	49.61	1.65	-68.55	108
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-37.53	6,194

System 1 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/16 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	22,074	0		22,074	14.37	*	22,074	19.18	*	-18,158	-18,158	10.60
Glass Solar	17,987	0		17,987	11.71	*	17,987	15.63	*	0	0	0.00
Glass Cond	3,619	0		3,619	2.36	*	3,619	3.14	*	-17,052	-17,052	9.95
Wall Cond	26,577	0		26,577	17.30	*	26,577	23.09	*	-52,660	-52,660	30.74
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	44,113			44,113	28.72	*	20,213	17.56	*	-83,461	-83,461	48.71
Sub Total==>	114,370	0		114,370	74.45	*	90,470	78.61	*	-171,332	-171,332	100.00
Internal Loads												
Lights	14,977	0		14,977	9.75	*	14,977	13.01	*	0	0	0.00
People	20,341			20,341	13.24	*	9,635	8.37	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	35,318	0	0	35,318	22.99	*	24,612	21.39	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				3,925	2.55	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	149,688	0	0	153,612	100.00	*	115,082	100.00	*	-171,332	-171,332	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	12.8	153.6	119.0	75.0 62.9 68.9	55.2 53.5 59.8	Part	4,954	
Aux Clg	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	0	
Opt Vent	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	Roof	4,954	0 0
Totals	12.8	153.6				Wall	3,329	473 14

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	--ENGINEERING CHECKS--	--TEMPERATURES (F)--
	(Mbh)	(cfm)	Deg F	Deg F	Vent			Clg % OA	Type Clg Htg
Main Htg	-171.3	5,519	68.0	96.5	Infil	1,198	1,198	Clg Cfm/Sqft	1.11 SADB 55.8 96.5
Aux Htg	0.0	0	0.0	0.0	Supply	5,519	5,519	Clg Cfm/Ton	431.14 Plenum 75.0 68.0
Preheat	-0.0	5,519	68.0	55.2	Minclm	0	0	Clg Sqft/Ton	387.00 Return 75.0 68.0
Reheat	0.0	0	0.0	0.0	Return	5,519	5,519	Clg Btuh/Sqft	31.01 Ret/OA 75.0 68.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	No. People	42 Runarnd 75.0 68.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg % OA	0.0 Fn MtrTD 0.2 0.0
Total	-171.3				Auxil	0	0	Htg Cfm/Sqft	1.11 Fn BldTD 0.1 0.0
								Htg Btuh/Sqft	-34.58 Fn Frict 0.4 0.0

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	416	0		416	7.76	*	477	11.86	*	-396	-396	5.35
Glass Solar	784	0		784	14.64	*	765	19.03	*	0	0	0.00
Glass Cond	136	0		136	2.53	*	145	3.61	*	-689	-689	9.31
Wall Cond	1,450	0		1,450	27.06	*	1,531	38.08	*	-2,474	-2,474	33.43
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	2,384			2,384	44.49	*	931	23.15	*	-3,844	-3,844	51.92
Sub Total==>	5,169	0		5,169	96.48	*	3,849	95.74	*	-7,403	-7,403	100.00
Internal Loads												
Lights	163	0		163	3.04	*	171	4.26	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	163	0	0	163	3.04	*	171	4.26	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				25	0.47	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	5,332	0	0	5,358	100.00	*	4,020	100.00	*	-7,403	-7,403	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf) (%)	
	(Tons)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor	108	
Main Clg	0.4	5.4	3.9	179	75.1	62.5	66.5	54.3	52.1	55.9	Part	0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	108
Totals	0.4	5.4									Wall	153

-----AREAS-----

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	--ENGINEERING CHECKS--		--TEMPERATURES (F)---		
	(Mbh)	(cfm)	Deg F	Deg F	Vent			Clg % OA	0.0	Type	Clg	Htg
Main Htg	-7.4	179	68.0	106.1	Infil	55	55	Clg Cfm/Sqft	1.65	SADB	54.3	106.1
Aux Htg	0.0	0	0.0	0.0	Supply	179	179	Clg Cfm/Ton	400.27	Plenum	75.0	68.0
Preheat	-0.0	179	68.0	54.2	Mincfm	0	0	Clg Sqft/Ton	241.89	Return	75.0	68.0
Reheat	0.0	0	0.0	0.0	Return	179	179	Clg Btuh/Sqft	49.61	Ret/OA	75.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	No. People	0	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-7.4				Auxil	0	0	Htg Cfm/Sqft	1.65	Fn BldTD	0.0	0.0
								Htg Btuh/Sqft	-68.55	Fn Frict	0.1	0.0

```
***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==>      Mo/Hr: 0/ 0      *      Mo/Hr: 0/ 0      *      Mo/Hr: 13/ 1
Outside Air ==>      OADB/WB/HR: 0/ 0/ 0.0      *      OADB: 0      *      OADB: 4
```

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Percent Of Tot (%)	*	Space Sensible (Btuh)	Percent Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Percent Of Tot (%)
Envelope Loads						*			*			
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	-22,703	-22,703	9.77
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-23,598	-23,598	10.15
Wall Cond	0	0		0	0.00	*	0	0.00	*	-71,927	-71,927	30.94
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-114,210	-114,210	49.14
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-232,438	-232,438	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
						*			*			
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-232,438	-232,438	100.00

--AREAS--

	Total Capacity (Tons)	(Mbh)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total		Glass (sf)	(%)
					Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor			
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	0		
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0		
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	6,194	0	0
Totals	0.0	0.0									Wall	4,555	655	14

--TEMPERATURES (F)---

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type Vent	Cooling 0	Heating 0	Clg % OA Clg Cfm/Sqft	0.0 0.00	Type SADB	Clg 0.0	Htg 68.1
Main Htg	-232.4	0	0.0	0.0	Infil	0	1,640	Clg Cfm/Ton	0.00	Plenum	0.0	68.0
Aux Htg	0.0	0	0.0	0.0	Supply	0	0	Clg Sqft/Ton	0.00	Return	0.0	68.0
Preheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	68.0
Reheat	0.0	0	0.0	0.0	Return	0	0	No. People	0	Runarnd	0.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/SqFt	0.00	Fn BldTD	0.0	0.0
Total	-232.4				Auxil	0	0	Htg Btuh/SqFt	-37.53	Fn Frict	0.0	0.0

BUILDING U-VALUES - ALTERNATIVE 2
REPLACE FLUORESCENT FIXTURES

----- B U I L D I N G U - V A L U E S -----

Room Number	Description	Part.	ExFlr	Room U-Values (Btu/hr/sqft/F)							Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
				Summr Skylt	Wintr Skylt	Summr Roof	Wintr Windo	Summr Windo	Wall	Ceil.		
1	OFFICES	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
3	WOMENS TOILET	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
1	OFFICES	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	30.5	9.34
2	CORRIDOR TOILETS	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	36.7	10.59
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	36.7	10.59
3	WOMENS TOILET	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	48.8	12.99
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	32.0	9.63
Building		0.000	0.000	0.000	0.000	0.057	0.550	0.563	0.288	0.000	31.5	9.54

BUILDING AREAS - ALTERNATIVE 2
REPLACE FLUORESCENT FIXTURES

----- B U I L D I N G A R E A S -----

Room Number	Description	Number of Duplicate		Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
		Flr	Rm										
1	OFFICES	1	1	4,954	4,954	0	0	0	0	4,954	473	14	2,855
Zone	1 Total/Ave.				4,954	0	0	0	0	4,954	473	14	2,855
System	1 Total/Ave.				4,954	0	0	0	0	4,954	473	14	2,855
3	WOMENS TOILET	1	1	108	108	0	0	0	0	108	19	12	134
Zone	3 Total/Ave.				108	0	0	0	0	108	19	12	134
System	2 Total/Ave.				108	0	0	0	0	108	19	12	134
1	OFFICES	1	1	4,954	4,954	0	0	0	0	4,954	473	14	2,855
Zone	1 Total/Ave.				4,954	0	0	0	0	4,954	473	14	2,855
2	CORRIDOR TOILETS	1	1	1,132	1,132	0	0	0	0	1,132	163	15	911
Zone	2 Total/Ave.				1,132	0	0	0	0	1,132	163	15	911
3	WOMENS TOILET	1	1	108	108	0	0	0	0	108	19	12	134
Zone	3 Total/Ave.				108	0	0	0	0	108	19	12	134
System	3 Total/Ave.				6,194	0	0	0	0	6,194	655	14	3,900
Building					11,256	0	0	0	0	11,256	1,148	14	6,890

ASHRAE 90 ANALYSIS - ALTERNATIVE 2
REPLACE FLUORESCENT FIXTURES

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.057 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.326 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.169 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTv) = 3.49 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTW) = 21.38 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2
REPLACE FLUORESCENT FIXTURES

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			----- Heating Airflow -----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.7	6	41	-20,559	14	347	284.9	0	0	0.0	0	0
5 - 10	1.3	3	22	-41,117	15	373	569.8	0	0	0.0	0	0
10 - 15	2.0	0	0	-61,676	23	567	854.7	0	0	0.0	0	0
15 - 20	2.6	7	45	-82,235	15	382	1,139.5	0	0	0.0	0	0
20 - 25	3.3	8	53	-102,793	12	295	1,424.4	0	0	0.0	0	0
25 - 30	4.0	10	68	-123,352	1	25	1,709.3	0	0	0.0	0	0
30 - 35	4.6	3	22	-143,911	2	38	1,994.2	0	0	0.0	0	0
35 - 40	5.3	11	76	-164,469	1	16	2,279.1	0	0	0.0	0	0
40 - 45	6.0	4	28	-185,028	0	0	2,564.0	0	0	0.0	0	0
45 - 50	6.6	9	65	-205,587	2	41	2,848.9	0	0	0.0	0	0
50 - 55	7.3	7	46	-226,145	1	29	3,133.7	0	0	0.0	0	0
55 - 60	7.9	10	68	-246,704	16	394	3,418.6	0	0	0.0	0	0
60 - 65	8.6	3	19	-267,263	0	0	3,703.5	0	0	0.0	0	0
65 - 70	9.3	6	40	-287,821	0	0	3,988.4	0	0	0.0	0	0
70 - 75	9.9	6	40	-308,380	0	0	4,273.3	0	0	0.0	0	0
75 - 80	10.6	3	18	-328,939	0	0	4,558.2	0	0	0.0	0	0
80 - 85	11.3	2	15	-349,497	0	0	4,843.1	0	0	0.0	0	0
85 - 90	11.9	0	0	-370,056	0	0	5,127.9	0	0	0.0	0	0
90 - 95	12.6	0	0	-390,615	0	0	5,412.8	0	0	0.0	0	0
95 - 100	13.2	4	25	-411,173	0	0	5,697.7	100	1,070	0.0	0	0
Hours Off	0.0	0	8,069	0	0	6,253	0.0	0	7,690	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2
 REPLACE FLUORESCENT FIXTURES

----- B U I L D I N G T E M P E R A T U R E P R O F I L E S -----

Temperature Range (F)	----- Zone Number -----				
	1	3	1	2	3

Max. Temp.	87.9	88.6	104.0	102.4	100.8
Mo./Hr.	7 21	7 20	7 22	7 22	8 21
Day Type	4	4	1	1	1

	..... Number of Hours				
Above 100	0	0	312	139	0
95 - 100	0	0	1,065	767	593
90 - 95	0	0	896	1,074	1,246
85 - 90	136	132	630	800	903
80 - 85	1,247	1,115	694	776	713
75 - 80	1,948	1,824	75	116	217
70 - 75	358	578	127	66	166
65 - 70	415	347	2,006	2,057	1,930
60 - 65	720	786	968	919	920
55 - 60	644	799	795	817	852
50 - 55	689	703	1,192	1,229	1,220
Below 50	2,603	2,476	0	0	0

Min. Temp.	32.5	33.1	54.9	55.0	54.9
Mo./Hr.	2 10	2 10	12 2	1 7	2 6
Day Type	4	4	4	1	2

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2
REPLACE FLUORESCENT FIXTURES

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	HOT WTR	HOT W DMND
	Off Peak (kWh)	On Peak (kW)	On Peak (Thrm)	On Peak (Thrm/hr)
Jan	2,163	11	542	2
Feb	1,957	11	519	2
March	2,368	11	285	2
April	2,058	11	78	2
May	3,014	30	0	0
June	4,204	33	0	0
July	4,936	34	0	0
Aug	4,389	33	0	0
Sept	2,727	32	0	0
Oct	2,264	11	74	2
Nov	2,059	11	203	2
Dec	2,060	11	444	2
Total	34,199	34	2,145	2

Building Energy Consumption = 29,423 (Btu/Sq Ft/Year)
Source Energy Consumption = 56,517 (Btu/Sq Ft/Year)

Floor Area = 11,256 (Sq Ft)

----- EQUIPMENT ENERGY CONSUMPTION -----

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UTILITY PEAK CHECKSUMS - ALTERNATIVE 2
REPLACE FLUORESCENT FIXTURES

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 34.1 (kW)
Yearly Time of Peak 15 (hr) 7 (mo)

Hour 15 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Perct Of Tot (%)
----------------------	------------------------	-----------------------	---------------------------	------------------------

Cooling Equipment

1	EQ1161	AIR-CLD CGND COMP <15 TONS	19.6	57.40
2	EQ1161	AIR-CLD CGND COMP <15 TONS	0.9	2.68

Sub Total			20.5	60.08
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Sub Total			0.0	0.00
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Air Moving Equipment

1		SUMMATION OF FAN ELECTRICAL DEMAND	2.4	6.92
2		SUMMATION OF FAN ELECTRICAL DEMAND	0.0	0.04

Sub Total			2.4	6.97
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Sub Total			0.0	0.00
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Miscellaneous

Lights			11.2	32.95
Base Utilities			0.0	0.00
Misc Equipment			0.0	0.00
Sub Total			11.2	32.95

Grand Total			34.1	100.00
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**          T R A C E    6 0 0    A N A L Y S I S          **  
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 45

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Reflectance: 0.20
Winter Ground Reflectance: 0.20

Air Density: 0.0742 (lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 14:32: 7 1/26/94
Dataset Name: CB458 .TM

AIRFLOW - ALTERNATIVE 3
COMBINED ECOS

----- S Y S T E M S U M M A R Y -----
(Design Airflow Quantities)

System Number	System Type	Main					Auxil. Supply	Room Exhaust
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Airflow (Cfm)	Airflow (Cfm)
1	SZ	0	5,519	5,519	6,285	766	0	0
2	PTAC	0	84	84	120	35	0	0
3	RAD	0	0	0	0	1,048	0	0
Totals		0	5,603	5,603	6,404	1,849	0	0

CAPACITY - ALTERNATIVE 3
COMBINED ECOS

----- S Y S T E M S U M M A R Y -----
(Design Capacity Quantities)

		Cooling				Heating						
		Main Sys.	Aux. Sys.	Opt. Vent	Cooling	Main Sys.	Aux. Sys.	Preheat	Reheat	Humidif.	Opt. Vent	Heating
System	System	Capacity	Capacity	Capacity	Totals	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity	Totals
Number	Type	(Tons)	(Tons)	(Tons)	(Tons)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)
	1 SZ	7.9	0.0	0.0	7.9	-89,100	0	0	0	0	0	-89,100
	2 PTAC	0.2	0.0	0.0	0.2	-3,811	0	0	0	0	0	-3,811
	3 RAD	0.0	0.0	0.0	0.0	-121,163	0	0	0	0	0	-121,163
Totals		8.1	0.0	0.0	8.1	-214,074	0	0	0	0	0	-214,074

The building peaked at hour 16 month 7 with a capacity of 8.1 tons

ENGINEERING CHECKS - ALTERNATIVE 3
COMBINED ECOS

----- E N G I N E E R I N G C H E C K S -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	Cooling				Heating		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	SZ	0.00	1.11	699.5	627.9	19.11	1.11	-17.99	4,954
2	Main	PTAC	0.00	0.78	342.4	438.5	27.37	0.78	-35.29	108
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-19.56	6,194

System 1 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/16 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 * OADB: 91 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)		Space Sensible (Btuh)	Perct Of Tot (%)		Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	8,689	0		8,689	9.18	*	8,689	12.09	*	-8,464	-8,464	9.50
Glass Solar	17,987	0		17,987	19.00	*	17,987	25.02	*	0	0	0.00
Glass Cond	3,619	0		3,619	3.82	*	3,619	5.03	*	-17,052	-17,052	19.14
Wall Cond	4,072	0		4,072	4.30	*	4,072	5.66	*	-10,261	-10,261	11.52
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	21,073			21,073	22.26	*	12,914	17.96	*	-53,322	-53,322	59.85
Sub Total==>	55,440	0		55,440	58.55	*	47,281	65.77	*	-89,100	-89,100	100.00
Internal Loads												
Lights	14,977	0		14,977	15.82	*	14,977	20.83	*	0	0	0.00
People	20,341			20,341	21.48	*	9,635	13.40	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	35,318	0	0	35,318	37.30	*	24,612	34.23	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				3,925	4.15	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	-0.00	*	0	-0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	90.758	0	0	94,682	100.00	*	71,893	100.00	*	-89,100	-89,100	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total Floor	Glass (sf) (%)
Main Clg	7.9	94.7	75.8	75.0 65.7 82.4	62.4 60.4 77.6	4,954	
Aux Clg	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	0	
Opt Vent	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	0	
Totals	7.9	94.7				4,954	0 0
						3,329	473 14

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
Main Htg	-89.1	5,519	68.0	82.8	Vent	0	0	Clg Cfm/Sqft	1.11	SADB	63.0	82.8
Aux Htg	0.0	0	0.0	0.0	Infil	766	766	Clg Cfm/Ton	699.48	Plenum	75.0	68.0
Preheat	-0.0	5,519	68.0	62.4	Supply	5,519	5,519	Clg Sqft/Ton	627.87	Return	75.0	68.0
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	19.11	Ret/OA	75.0	68.0
Humidif	0.0	0	0.0	0.0	Return	5,519	5,519	No. People	42	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.2	0.0
Total	-89.1				Rm Exh	0	0	Htg Cfm/SqFt	1.11	Fn BldTD	0.1	0.0
					Auxil	0	0	Htg Btuh/SqFt	-17.99	Fn Frict	0.4	0.0

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	134	0		134	4.53	*	188	8.96	*	-185	-185	4.84
Glass Solar	784	0		784	26.53	*	765	36.40	*	0	0	0.00
Glass Cond	136	0		136	4.59	*	145	6.91	*	-689	-689	18.08
Wall Cond	204	0		204	6.91	*	237	11.29	*	-482	-482	12.65
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	1,523			1,523	51.53	*	595	28.30	*	-2,456	-2,456	64.43
Sub Total==>	2,781	0		2,781	94.08	*	1,930	91.85	*	-3,811	-3,811	100.00
Internal Loads						*			*			
Lights	163	0		163	5.52	*	171	8.15	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	163	0	0	163	5.52	*	171	8.15	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				12	0.41	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	2,944	0	0	2,956	100.00	*	2,102	100.00	*	-3,811	-3,811	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor	
Main Clg	0.2	3.0	2.0	84	75.1	62.5	66.5	52.0	50.1	52.0	Part	108
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	108
Totals	0.2	3.0									Wall	153

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	--ENGINEERING CHECKS--		--TEMPERATURES (F)--		
	(Mbh)	(cfm)	Deg F	Deg F				Clg % OA	0.0	Type	Clg	Htg
Main Htg	-3.8	84	68.0	109.5	Vent	0	0	Clg Cfm/Sqft	0.78	SADB	52.1	109.5
Aux Htg	0.0	0	0.0	0.0	Infil	35	35	Clg Cfm/Ton	342.40	Plenum	75.0	68.0
Preheat	-0.0	84	68.0	52.0	Supply	84	84	Clg Sqft/Ton	438.45	Return	75.0	68.0
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	27.37	Ret/OA	75.0	68.0
Humidif	0.0	0	0.0	0.0	Return	84	84	No. People	0	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-3.8				Rm Exh	0	0	Htg Cfm/Sqft	0.78	Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/Sqft	-35.29	Fn Frict	0.1	0.0

System 3 Block RAD - RADIATION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Percent Of Tot (%)	*	Space Sensible (Btuh)	Percent Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Percent Of Tot (%)
Envelope Loads						*			*			
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	-10,582	-10,582	8.73
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-23,598	-23,598	19.48
Wall Cond	0	0		0	0.00	*	0	0.00	*	-14,016	-14,016	11.57
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-72,967	-72,967	60.22
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-121,163	-121,163	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-121,163	-121,163	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
				Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor		
Main Clg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Part	0	
Aux Clg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0	
Opt Vent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	6,194	0 0
Totals	0.0	0.0								Wall	4,555	655 14

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	AIRFLOWS (cfm)		ENGINEERING CHECKS--		TEMPERATURES (F)---		
						Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
Main Htg	-121.2	0	0.0	0.0	Infil	0	0	Clg Cfm/Sqft	0.00	SADB	0.0	68.1
Aux Htg	0.0	0	0.0	0.0	Supply	0	0	Clg Cfm/Ton	0.00	Plenum	0.0	68.0
Preheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Sqft/Ton	0.00	Return	0.0	68.0
Reheat	0.0	0	0.0	0.0	Return	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	No. People	0	Runarnd	0.0	68.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-121.2				Auxil	0	0	Htg Cfm/Sqft	0.00	Fn BldTD	0.0	0.0
								Htg Btuh/Sqft	-19.56	Fn Frict	0.0	0.0

BUILDING U-VALUES - ALTERNATIVE 3
COMBINED ECOS

----- B U I L D I N G U - V A L U E S -----

Room Number	Description	Part.	ExFlr	Room U-Values (Btu/hr/sqft/F)						Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)	
				Summr Skylt	Wintr Skylt	Summr Roof	Wintr Windo	Windo	Wall			Ceil.
1	OFFICES	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	32.9	9.82
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	32.9	9.82
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	32.9	9.82
3	WOMENS TOILET	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	52.8	13.79
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	52.8	13.79
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	52.8	13.79
1	OFFICES	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	32.9	9.82
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	32.9	9.82
2	CORRIDOR TOILETS	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	39.7	11.18
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	39.7	11.18
3	WOMENS TOILET	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	52.8	13.79
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	52.8	13.79
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	34.5	10.14
Building		0.000	0.000	0.000	0.000	0.027	0.550	0.563	0.056	0.000	34.0	10.03

BUILDING AREAS - ALTERNATIVE 3
COMBINED ECOS

----- B U I L D I N G A R E A S -----

Room Number	Description	Number of		Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed		Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
		Flr	Rm				Floor Area (sqft)	Skylight Area (sqft)					
1	OFFICES	1	1	4,954	4,954	0	0	0	0	4,954	473	14	2,855
Zone	1 Total/Ave.				4,954	0	0	0	0	4,954	473	14	2,855
System	1 Total/Ave.				4,954	0	0	0	0	4,954	473	14	2,855
3	WOMENS TOILET	1	1	108	108	0	0	0	0	108	19	12	134
Zone	3 Total/Ave.				108	0	0	0	0	108	19	12	134
System	2 Total/Ave.				108	0	0	0	0	108	19	12	134
1	OFFICES	1	1	4,954	4,954	0	0	0	0	4,954	473	14	2,855
Zone	1 Total/Ave.				4,954	0	0	0	0	4,954	473	14	2,855
2	CORRIDOR TOILETS	1	1	1,132	1,132	0	0	0	0	1,132	163	15	911
Zone	2 Total/Ave.				1,132	0	0	0	0	1,132	163	15	911
3	WOMENS TOILET	1	1	108	108	0	0	0	0	108	19	12	134
Zone	3 Total/Ave.				108	0	0	0	0	108	19	12	134
System	3 Total/Ave.				6,194	0	0	0	0	6,194	655	14	3,900
Building					11,256	0	0	0	0	11,256	1,148	14	6,890

ASHRAE 90 ANALYSIS - ALTERNATIVE 3
COMBINED ECOS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.027 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.127 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.068 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 1.33 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTVw) = 13.54 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 3
COMBINED ECOS

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.4	0	4	-10,704	22	406	280.2	0	0	0.0	0	0
5 - 10	0.8	2	16	-21,407	17	321	560.3	0	0	0.0	0	0
10 - 15	1.2	0	0	-32,111	14	268	840.5	0	0	0.0	0	0
15 - 20	1.6	7	59	-42,815	10	189	1,120.7	0	0	0.0	0	0
20 - 25	2.0	3	22	-53,519	5	98	1,400.8	0	0	0.0	0	0
25 - 30	2.4	5	41	-64,222	1	17	1,681.0	0	0	0.0	0	0
30 - 35	2.8	13	105	-74,926	1	17	1,961.2	0	0	0.0	0	0
35 - 40	3.3	5	39	-85,630	1	22	2,241.3	0	0	0.0	0	0
40 - 45	3.7	12	101	-96,333	2	36	2,521.5	0	0	0.0	0	0
45 - 50	4.1	5	43	-107,037	0	7	2,801.7	0	0	0.0	0	0
50 - 55	4.5	6	52	-117,741	0	9	3,081.8	0	0	0.0	0	0
55 - 60	4.9	7	56	-128,444	26	479	3,362.0	0	0	0.0	0	0
60 - 65	5.3	6	49	-139,148	0	0	3,642.2	0	0	0.0	0	0
65 - 70	5.7	6	50	-149,852	0	0	3,922.3	0	0	0.0	0	0
70 - 75	6.1	2	15	-160,556	0	0	4,202.5	0	0	0.0	0	0
75 - 80	6.5	7	60	-171,259	0	0	4,482.7	0	0	0.0	0	0
80 - 85	6.9	0	0	-181,963	0	0	4,762.8	0	0	0.0	0	0
85 - 90	7.3	0	0	-192,667	0	0	5,043.0	0	0	0.0	0	0
90 - 95	7.7	1	5	-203,370	0	0	5,323.2	0	0	0.0	0	0
95 - 100	8.1	14	115	-214,074	0	0	5,603.3	100	1,070	0.0	0	0
Hours Off	0.0	0	7,928	0	0	6,891	0.0	0	7,690	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 3
 COMBINED ECOS

----- BUILDING TEMPERATURE PROFILES -----

Temperature Range (F)	Zone Number				
	1	3	1	2	3

Max. Temp.	85.7	86.0	112.5	107.3	104.5
Mo./Hr.	7 21	7 21	8 21	8 21	8 21
Day Type	4	4	1	1	1

	Number of Hours				
Above 100	0	0	2,355	1,532	1,129
95 - 100	0	0	533	1,098	966
90 - 95	0	0	72	298	833
85 - 90	57	58	442	128	40
80 - 85	1,153	878	508	490	452
75 - 80	2,350	2,192	198	262	371
70 - 75	548	748	404	344	325
65 - 70	291	390	2,093	2,023	2,081
60 - 65	1,106	851	922	1,141	1,080
55 - 60	303	656	550	703	732
50 - 55	1,451	739	683	741	751
Below 50	1,501	2,248	0	0	0

Min. Temp.	36.1	36.3	54.9	55.0	55.0
Mo./Hr.	2 8	2 9	12 6	1 9	1 8
Day Type	5	5	4	3	3

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 3
COMBINED ECOS

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	HOT WTR	HOT W DMND
	Off Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	2,162	11	254	1
Feb	1,956	11	242	1
March	2,367	11	120	1
April	2,058	11	22	1
May	3,055	24	0	0
June	4,055	26	0	0
July	4,412	26	0	0
Aug	4,255	26	0	0
Sept	2,961	25	0	0
Oct	2,263	11	13	1
Nov	2,058	11	76	1
Dec	2,059	11	199	1
Total	33,661	26	926	1

Building Energy Consumption = 18,433 (8tu/Sq Ft/year)
Source Energy Consumption = 41,592 (8tu/Sq Ft/Year)

Floor Area = 11,256 (Sq Ft)

----- EQUIPMENT ENERGY CONSUMPTION -----

[illegible]

V 600
PAGE 38

[illegible]

UTILITY PEAK CHECKSUMS - ALTERNATIVE 3
COMBINED ECOS

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 26.5 (kW)
Yearly Time of Peak 15 (hr) 7 (mo)

Hour 15 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Percent Of Tot (%)
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Cooling Equipment

1	EQ1161	AIR-CLD COND COMP <15 TONS	12.2	46.10
2	EQ1161	AIR-CLD COND COMP <15 TONS	0.7	2.53

Sub Total			12.9	48.63
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Sub Total			0.0	0.00
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Air Moving Equipment

1		SUMMATION OF FAN ELECTRICAL DEMAND	2.4	8.91
2		SUMMATION OF FAN ELECTRICAL DEMAND	0.0	0.03

Sub Total			2.4	8.94
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Sub Total			0.0	0.00
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Miscellaneous

Lights			11.2	42.43
Base Utilities			0.0	0.00
Misc Equipment			0.0	0.00
Sub Total			11.2	42.43

Grand Total			26.5	100.00
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Building 046
Trace Input File

933702

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LINE #	
1	JOB - 1
2	01/ENERGY SAVINGS OPPORTUNITY STUDY
3	01/CARLISLE BARRACKS, PA
4	01/DEPARTMENT OF THE ARMY
5	01/BENATEC ASSOCIATES
6	01/BUILDING 46
7	08/CARLISLE
8	09/MAY/SEP///APR/OCT
9	10/CLTD-CLF
10	11///ZONE
11	LOAD - 1
12	19/1/BASE BUILDING
13	20/1/1/1ST FL OFFICES/8053/1/2/2//11
14	20/2/2/LIQUOR STORE/1127/1/2/2//11
15	20/3/3/LIQUOR STORAGE/901/1/2/2//11
16	20/4/4/LIBRARY/3692/1/2/2//11
17	20/5/5/GAME ROOM/4154/1/2/2//11
18	20/6/6/2ND FL OFFICES/1139/1/2/2//11
19	20/7/7/2ND FL OFFICE/248/1/2/2//11
20	20/8/8/2ND FL TOILETS/582/1/2/2//11
21	21/M///CBADCTX///CBADHTX
22	22/4/1/YES///186
23	22/5/1/YES///186
24	22/6/1/YES///186
25	22/7/1/YES///186
26	22/8/1/YES///186
27	24/1/1/105/8.5//170/35
28	24/1/2/32/8.5//170/125
29	24/1/3/73/8.5//170/215
30	24/1/4/90/8.5//170/305
31	24/2/1/17/8.5//170/35
32	24/2/2/53/8.5//170/125
33	24/2/3/17/8.5//170/215
34	24/3/1/16/8.5//170/215
35	24/4/1/32/8.5//170/125
36	24/4/2/73/8.5//170/215
37	24/4/3/49/8.5//170/305
38	24/5/1/55/8.5//170/305
39	24/5/2/73/8.5//170/35
40	24/5/3/31/8.5//170/125
41	24/6/1/33/8.5//170/35
42	24/6/2/37/8.5//170/125
43	24/7/1/16/8.5//170/125
44	24/7/2/16/8.5//170/215
45	24/8/1/16/8.5//170/215
46	24/8/2/17/8.5//170/305
47	25/1/1/6/4/8/.81/.64
48	25/1/2/6/4/7/.81/.64
49	25/1/3/6/4/6/.81/.64
50	25/1/4/6/4/5/.81/.64
51	25/3/1/6/4/1/.81/.64
52	25/4/1/6/4/4/.81/.64
53	25/4/2/6/4/10/.81/.64
54	25/4/3/6/4/10/.81/.64
55	25/5/1/6/4/10/.81/.64
56	25/5/2/6/4/10/.81/.64
57	25/5/3/6/4/4/.81/.64
58	25/6/1/6/4/4/.81/.64

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LINE # -----

59 25/6/2/6/4/4/.81/.64

60 25/7/1/6/4/2/.81/.64

61 25/7/2/6/4/2/.81/.64

62 25/8/1/6/4/2/.81/.64

63 25/8/2/6/4/2/.81/.64

64 26/1/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPFAN/OFF/OFF/OFF/OFF

65 26/2/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPFAN/OFF/OFF/OFF/OFF

66 26/3/CBAP&L/CBAP&L/CBAP&L//OFF/OFF/CBAPHTG/OFF/OFF/OFF

67 26/4/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPCLG/CBAPHTG/OFF/OFF/OFF

68 26/5/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPCLG/CBAPHTG/OFF/OFF/OFF

69 26/6/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPCLG/CBAPHTG/OFF/OFF/OFF

70 26/7/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPCLG/OFF/OFF/OFF/OFF

71 26/8/OFF/CBAP&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF

72 27/M/280/SF-PERS/285/290/2.4/WATT-SF

73 29/1/15/PCT-MCLG/15/PCT-MHTG/.66/CFM-SF/.66/CFM-SF

74 29/2///// .66/CFM-SF/.66/CFM-SF

75 29/3///// .66/CFM-SF

76 29/4/10/PCT-MCLG///.66/CFM-SF/.66/CFM-SF

77 29/5/10/PCT-MCLG///.66/CFM-SF/.66/CFM-SF

78 29/6///// .66/CFM-SF/.66/CFM-SF

79 29/7///// .66/CFM-SF/.66/CFM-SF

80 29/8///// .66/CFM-SF

81 30/1

82 30/2/1400/CFM/1500/CFM

83 30/3///750/CFM

84 30/4/4950/CFM

85 30/5/3830/CFM

86 SYSTEM - 1

87 39/1/BASE BUILDING

88 40/1/SZ

89 41/1/1/2/4/5

90 42/1/1.1/1.1

91 45/1/CBAPCLG/OFF/OFF/OFF/OFF/CBAPHTG/OFF/OFF/OFF/OFF

92 40/2/PTAC

93 41/2/6/7

94 42/2/.2

95 45/2/CBAPCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

96 40/3/RAD

97 41/3/7/8

98 42/3

99 45/3/OFF/OFF/OFF/OFF/OFF/CBAPHTG/OFF/OFF/OFF/OFF

100 40/4/UH

101 41/4/3/6

102 42/4//.2

103 45/4/OFF/OFF/OFF/OFF/OFF/CBAPHTG/OFF/OFF/OFF/OFF

104 EQUIPMENT - 1

105 59/1/CARLISLE///BASE BUILDING

106 60/1/1/PKPLANT/1/1

107 60/2/2/PKPLANT/2/2

108 62/1/EQ1161/4

109 62/2/EQ1161/5

110 65/1/1//1/1/3/4

111 67/1/EQ2102/1

112 69/1/EQ4003

113 69/2/EQ4003

114 69/3

115 69/4//EQ4381

116 LOAD - 2

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LINE #	-----
117	19/2/WALL & ROOF INSULATION
118	20/1/1/1ST FL OFFICES/8053/1/2/2//11
119	20/2/2/LIQUOR STORE/1127/1/2/2//11
120	20/3/3/LIQUOR STORAGE/901/1/2/2//11
121	20/4/4/LIBRARY/3692/1/2/2//11
122	20/5/5/GAME ROOM/4154/1/2/2//11
123	20/6/6/2ND FL OFFICES/1139/1/2/2//11
124	20/7/7/2ND FL OFFICE/248/1/2/2//11
125	20/8/8/2ND FL TOILETS/582/1/2/2//11
126	21/M////CBADCTX//CBADHTX
127	22/4/1/YES////185
128	22/5/1/YES////185
129	22/6/1/YES////185
130	22/7/1/YES////185
131	22/8/1/YES////185
132	24/1/1/105/8.5//183/35
133	24/1/2/32/8.5//183/125
134	24/1/3/73/8.5//183/215
135	24/1/4/90/8.5//183/305
136	24/2/1/17/8.5//183/35
137	24/2/2/53/8.5//183/125
138	24/2/3/17/8.5//183/215
139	24/3/1/16/8.5//183/215
140	24/4/1/32/8.5//183/125
141	24/4/2/73/8.5//183/215
142	24/4/3/49/8.5//183/305
143	24/5/1/55/8.5//183/305
144	24/5/2/73/8.5//183/35
145	24/5/3/31/8.5//183/125
146	24/6/1/33/8.5//183/35
147	24/6/2/37/8.5//183/125
148	24/7/1/16/8.5//183/125
149	24/7/2/16/8.5//183/215
150	24/8/1/16/8.5//183/215
151	24/8/2/17/8.5//183/305
152	25/1/1/6/4/8/.81/.64
153	25/1/2/6/4/7/.81/.64
154	25/1/3/6/4/6/.81/.64
155	25/1/4/6/4/5/.81/.64
156	25/3/1/6/4/1/.81/.64
157	25/4/1/6/4/4/.81/.64
158	25/4/2/6/4/10/.81/.64
159	25/4/3/6/4/10/.81/.64
160	25/5/1/6/4/10/.81/.64
161	25/5/2/6/4/10/.81/.64
162	25/5/3/6/4/4/.81/.64
163	25/6/1/6/4/4/.81/.64
164	25/6/2/6/4/4/.81/.64
165	25/7/1/6/4/2/.81/.64
166	25/7/2/6/4/2/.81/.64
167	25/8/1/6/4/2/.81/.64
168	25/8/2/6/4/2/.81/.64
169	26/1/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPFAN/OFF/OFF/OFF/OFF
170	26/2/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPFAN/OFF/OFF/OFF/OFF
171	26/3/CBAP&L/CBAP&L/CBAP&L//OFF/OFF/CBAPHTG/OFF/OFF/OFF
172	26/4/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPCLG/CBAPHTG/OFF/OFF/OFF
173	26/5/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPCLG/CBAPHTG/OFF/OFF/OFF
174	26/6/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPCLG/CBAPHTG/OFF/OFF/OFF

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LINE #	-----
175	26/7/CBAP&L/CBAP&L/CBAP&L//OFF/CBADCLG/OFF/OFF/OFF/OFF
176	26/8/OFF/CBAP&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF
177	27/M/280/SF-PERS/285/290/2.4/WATT-SF
178	29/1/15/PCT-MCLG/15/PCT-MHTG/.51/CFM-SF/.51/CFM-SF
179	29/2/////51/CFM-SF/.51/CFM-SF
180	29/3/////51/CFM-SF
181	29/4/10/PCT-MCLG///.51/CFM-SF/.51/CFM-SF
182	29/5/10/PCT-MCLG///.51/CFM-SF/.51/CFM-SF
183	29/6/////51/CFM-SF/.51/CFM-SF
184	29/7/////51/CFM-SF/.51/CFM-SF
185	29/8/////51/CFM-SF
186	30/1
187	30/2/1400/CFM/1500/CFM
188	30/3///750/CFM
189	30/4/4950/CFM
190	30/5/3830/CFM
191	SYSTEM - 2
192	39/2/WALL & ROOF INSULATION
193	40/1/SZ
194	41/1/1/2/4/5
195	42/1/1.1/1.1
196	45/1/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
197	40/2/PTAC
198	41/2/6/7
199	42/2/.2
200	45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
201	40/3/RAD
202	41/3/7/8
203	42/3
204	45/3/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
205	40/4/UH
206	41/4/3/6
207	42/4//.2
208	45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
209	EQUIPMENT - 2
210	59/2/CARLISLE//WALL & ROOF INSULATION
211	60/1/1/PKPLANT/1/1
212	60/2/2/PKPLANT/2/2
213	62/1/EQ1161/4
214	62/2/EQ1161/5
215	65/1/1//1/1/3/4
216	67/1/EQ2102/1
217	69/1/EQ4003
218	69/2/EQ4003
219	69/3
220	69/4//EQ4381
221	LOAD - 3
222	19/3/REPLACE FLUORESCENT LAMPS
223	20/1/1/1ST FL OFFICES/8053/1/2/2//11
224	20/2/2/LIQUOR STORE/1127/1/2/2//11
225	20/3/3/LIQUOR STORAGE/901/1/2/2//11
226	20/4/4/LIBRARY/3692/1/2/2//11
227	20/5/5/GAME ROOM/4154/1/2/2//11
228	20/6/6/2ND FL OFFICES/1139/1/2/2//11
229	20/7/7/2ND FL OFFICE/248/1/2/2//11
230	20/8/8/2ND FL TOILETS/582/1/2/2//11
231	21/M///CBADCTX///CBADHTX
232	22/4/1/YES////186

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LINE #	
233	22/5/1/YES////186
234	22/6/1/YES////186
235	22/7/1/YES////186
236	22/8/1/YES////186
237	24/1/1/105/8.5//170/35
238	24/1/2/32/8.5//170/125
239	24/1/3/73/8.5//170/215
240	24/1/4/90/8.5//170/305
241	24/2/1/17/8.5//170/35
242	24/2/2/53/8.5//170/125
243	24/2/3/17/8.5//170/215
244	24/3/1/16/8.5//170/215
245	24/4/1/32/8.5//170/125
246	24/4/2/73/8.5//170/215
247	24/4/3/49/8.5//170/305
248	24/5/1/55/8.5//170/305
249	24/5/2/73/8.5//170/35
250	24/5/3/31/8.5//170/125
251	24/6/1/33/8.5//170/35
252	24/6/2/37/8.5//170/125
253	24/7/1/16/8.5//170/125
254	24/7/2/16/8.5//170/215
255	24/8/1/16/8.5//170/215
256	24/8/2/17/8.5//170/305
257	25/1/1/6/4/8/.81/.64
258	25/1/2/6/4/7/.81/.64
259	25/1/3/6/4/6/.81/.64
260	25/1/4/6/4/5/.81/.64
261	25/3/1/6/4/1/.81/.64
262	25/4/1/6/4/4/.81/.64
263	25/4/2/6/4/10/.81/.64
264	25/4/3/6/4/10/.81/.64
265	25/5/1/6/4/10/.81/.64
266	25/5/2/6/4/10/.81/.64
267	25/5/3/6/4/4/.81/.64
268	25/6/1/6/4/4/.81/.64
269	25/6/2/6/4/4/.81/.64
270	25/7/1/6/4/2/.81/.64
271	25/7/2/6/4/2/.81/.64
272	25/8/1/6/4/2/.81/.64
273	25/8/2/6/4/2/.81/.64
274	26/1/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPFAN/OFF/OFF/OFF/OFF
275	26/2/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPFAN/OFF/OFF/OFF/OFF
276	26/3/CBAP&L/CBAP&L/CBAP&L//OFF/OFF/CBAPHTG/OFF/OFF/OFF
277	26/4/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPCLG/CBAPHTG/OFF/OFF/OFF
278	26/5/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPCLG/CBAPHTG/OFF/OFF/OFF
279	26/6/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPCLG/CBAPHTG/OFF/OFF/OFF
280	26/7/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPCLG/OFF/OFF/OFF/OFF
281	26/8/OFF/CBAP&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF
282	27/M/280/SF-PERS/285/290/2.1/WATT-SF
283	29/1/15/PCT-MCLG/15/PCT-MHTG/.66/CFM-SF/.66/CFM-SF
284	29/2/////66/CFM-SF/.66/CFM-SF
285	29/3/////66/CFM-SF
286	29/4/10/PCT-MCLG///.66/CFM-SF/.66/CFM-SF
287	29/5/10/PCT-MCLG///.66/CFM-SF/.66/CFM-SF
288	29/6/////66/CFM-SF/.66/CFM-SF
289	29/7/////66/CFM-SF/.66/CFM-SF
290	29/8/////66/CFM-SF

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LINE #	
291	30/1
292	30/2/1400/CFM/1500/CFM
293	30/3///750/CFM
294	30/4/4950/CFM
295	30/5/3830/CFM
296	SYSTEM - 3
297	39/3/REPLACE FLUORESCENT LAMPS
298	40/1/SZ
299	41/1/1/2/4/5
300	42/1/1.1/1.1
301	45/1/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
302	40/2/PTAC
303	41/2/6/7
304	42/2/.2
305	45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
306	40/3/RAD
307	41/3/7/8
308	42/3
309	45/3/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
310	40/4/UH
311	41/4/3/6
312	42/4//.2
313	45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
314	EQUIPMENT - 3
315	59/3/CARLISLE///REPLACE FLUORESCENT LAMPS
316	60/1/1/PKPLANT/1/1
317	60/2/2/PKPLANT/2/2
318	62/1/EQ1161/4
319	62/2/EQ1161/5
320	65/1/1//1/1/3/4
321	67/1/EQ2102/1
322	69/1/EQ4003
323	69/2/EQ4003
324	69/3
325	69/4//EQ4381
326	LOAD - 4
327	19/4/REPLACE FLUORESCENT BALLASTS
328	20/1/1/1ST FL OFFICES/8053/1/2/2//11
329	20/2/2/LIQUOR STORE/1127/1/2/2//11
330	20/3/3/LIQUOR STORAGE/901/1/2/2//11
331	20/4/4/LIBRARY/3692/1/2/2//11
332	20/5/5/GAME ROOM/4154/1/2/2//11
333	20/6/6/2ND FL OFFICES/1139/1/2/2//11
334	20/7/7/2ND FL OFFICE/248/1/2/2//11
335	20/8/8/2ND FL TOILETS/582/1/2/2//11
336	21/M///CBADCTX///CBADHTX
337	22/4/1/YES///186
338	22/5/1/YES///186
339	22/6/1/YES///186
340	22/7/1/YES///186
341	22/8/1/YES///186
342	24/1/1/105/8.5//170/35
343	24/1/2/32/8.5//170/125
344	24/1/3/73/8.5//170/215
345	24/1/4/90/8.5//170/305
346	24/2/1/17/8.5//170/35
347	24/2/2/53/8.5//170/125
348	24/2/3/17/8.5//170/215

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LINE #	
349	24/3/1/16/8.5//170/215
350	24/4/1/32/8.5//170/125
351	24/4/2/73/8.5//170/215
352	24/4/3/49/8.5//170/305
353	24/5/1/55/8.5//170/305
354	24/5/2/73/8.5//170/35
355	24/5/3/31/8.5//170/125
356	24/6/1/33/8.5//170/35
357	24/6/2/37/8.5//170/125
358	24/7/1/16/8.5//170/125
359	24/7/2/16/8.5//170/215
360	24/8/1/16/8.5//170/215
361	24/8/2/17/8.5//170/305
362	25/1/1/6/4/8/.81/.64
363	25/1/2/6/4/7/.81/.64
364	25/1/3/6/4/6/.81/.64
365	25/1/4/6/4/5/.81/.64
366	25/3/1/6/4/1/.81/.64
367	25/4/1/6/4/4/.81/.64
368	25/4/2/6/4/10/.81/.64
369	25/4/3/6/4/10/.81/.64
370	25/5/1/6/4/10/.81/.64
371	25/5/2/6/4/10/.81/.64
372	25/5/3/6/4/4/.81/.64
373	25/6/1/6/4/4/.81/.64
374	25/6/2/6/4/4/.81/.64
375	25/7/1/6/4/2/.81/.64
376	25/7/2/6/4/2/.81/.64
377	25/8/1/6/4/2/.81/.64
378	25/8/2/6/4/2/.81/.64
379	26/1/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPFAN/OFF/OFF/OFF/OFF
380	26/2/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPFAN/OFF/OFF/OFF/OFF
381	26/3/CBAP&L/CBAP&L/CBAP&L//OFF/OFF/CBAPHTG/OFF/OFF/OFF
382	26/4/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPCLG/CBAPHTG/OFF/OFF/OFF
383	26/5/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPCLG/CBAPHTG/OFF/OFF/OFF
384	26/6/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPCLG/CBAPHTG/OFF/OFF/OFF
385	26/7/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPCLG/OFF/OFF/OFF/OFF
386	26/8/OFF/CBAP&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF
387	27/M/280/SF-PERS/285/290/1.8/WATT-SF
388	29/1/15/PCT-MCLG/15/PCT-MHTG/.66/CFM-SF/.66/CFM-SF
389	29/2///// .66/CFM-SF/.66/CFM-SF
390	29/3///// .66/CFM-SF
391	29/4/10/PCT-MCLG///.66/CFM-SF/.66/CFM-SF
392	29/5/10/PCT-MCLG///.66/CFM-SF/.66/CFM-SF
393	29/6///// .66/CFM-SF/.66/CFM-SF
394	29/7///// .66/CFM-SF/.66/CFM-SF
395	29/8///// .66/CFM-SF
396	30/1
397	30/2/1400/CFM/1500/CFM
398	30/3///750/CFM
399	30/4/4950/CFM
400	30/5/3830/CFM
401	SYSTEM - 4
402	39/4/REPLACE FLUORESCENT BALLASTS
403	40/1/SZ
404	41/1/1/2/4/5
405	42/1/1.1/1.1
406	45/1/CBAPCLG/OFF/OFF/OFF/OFF/CBAPHTG/OFF/OFF/OFF/OFF

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LINE #	-----
407	40/2/PTAC
408	41/2/6/7
409	42/2/.2
410	45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
411	40/3/RAD
412	41/3/7/8
413	42/3
414	45/3/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
415	40/4/UH
416	41/4/3/6
417	42/4//.2
418	45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
419	EQUIPMENT - 4
420	59/4/CARLISLE///REPLACE FLUORESCENT BALLASTS
421	60/1/1/PKPLANT/1/1
422	60/2/2/PKPLANT/2/2
423	62/1/EQ1161/4
424	62/2/EQ1161/5
425	65/1/1//1/1/3/4
426	67/1/EQ2102/1
427	69/1/EQ4003
428	69/2/EQ4003
429	69/3
430	69/4//EQ4381

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LINE # -----

1 JOB - 1

2 01/ENERGY SAVINGS OPPORTUNITY STUDY

3 01/CARLISLE BARRACKS, PA

4 01/DEPARTMENT OF THE ARMY

5 01/BENATEC ASSOCIATES

6 01/BUILDING 46

7 08/CARLISLE

8 09/MAY/SEP////APR/OCT

9 10/CLTD-CLF

10 11///ZONE

11 LOAD - 1

12 19/1/REPLACE FLUORESCENT FIXTURES

13 20/1/1/1ST FL OFFICES/8053/1/2/2//11

14 20/2/2/LIQUOR STORE/1127/1/2/2//11

15 20/3/3/LIQUOR STORAGE/901/1/2/2//11

16 20/4/4/LIBRARY/3692/1/2/2//11

17 20/5/5/GAME ROOM/4154/1/2/2//11

18 20/6/6/2ND FL OFFICES/1139/1/2/2//11

19 20/7/7/2ND FL OFFICE/248/1/2/2//11

20 20/8/8/2ND FL TOILETS/582/1/2/2//11

21 21/M////CBADCTX//CBADHTX

22 22/4/1/YES////186

23 22/5/1/YES////186

24 22/6/1/YES////186

25 22/7/1/YES////186

26 22/8/1/YES////186

27 24/1/1/105/8.5//170/35

28 24/1/2/32/8.5//170/125

29 24/1/3/73/8.5//170/215

30 24/1/4/90/8.5//170/305

31 24/2/1/17/8.5//170/35

32 24/2/2/53/8.5//170/125

33 24/2/3/17/8.5//170/215

34 24/3/1/16/8.5//170/215

35 24/4/1/32/8.5//170/125

36 24/4/2/73/8.5//170/215

37 24/4/3/49/8.5//170/305

38 24/5/1/55/8.5//170/305

39 24/5/2/73/8.5//170/35

40 24/5/3/31/8.5//170/125

41 24/6/1/33/8.5//170/35

42 24/6/2/37/8.5//170/125

43 24/7/1/16/8.5//170/125

44 24/7/2/16/8.5//170/215

45 24/8/1/16/8.5//170/215

46 24/8/2/17/8.5//170/305

47 25/1/1/6/4/8/.81/.64

48 25/1/2/6/4/7/.81/.64

49 25/1/3/6/4/6/.81/.64

50 25/1/4/6/4/5/.81/.64

51 25/3/1/6/4/1/.81/.64

52 25/4/1/6/4/4/.81/.64

53 25/4/2/6/4/10/.81/.64

54 25/4/3/6/4/10/.81/.64

55 25/5/1/6/4/10/.81/.64

56 25/5/2/6/4/10/.81/.64

57 25/5/3/6/4/4/.81/.64

58 25/6/1/6/4/4/.81/.64

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LINE #	-----
59	25/6/2/6/4/4/.81/.64
60	25/7/1/6/4/2/.81/.64
61	25/7/2/6/4/2/.81/.64
62	25/8/1/6/4/2/.81/.64
63	25/8/2/6/4/2/.81/.64
64	26/1/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPFAN/OFF/OFF/OFF/OFF
65	26/2/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPFAN/OFF/OFF/OFF/OFF
66	26/3/CBAP&L/CBAP&L/CBAP&L//OFF/OFF/CBAPHTG/OFF/OFF/OFF
67	26/4/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPCLG/CBAPHTG/OFF/OFF/OFF
68	26/5/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPCLG/CBAPHTG/OFF/OFF/OFF
69	26/6/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPCLG/CBAPHTG/OFF/OFF/OFF
70	26/7/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPCLG/OFF/OFF/OFF/OFF
71	26/8/OFF/CBAP&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF
72	27/M/280/SF-PERS/285/290/1.5/WATT-SF
73	29/1/15/PCT-MCLG/15/PCT-MHTG/.66/CFM-SF/.66/CFM-SF
74	29/2///// .66/CFM-SF/.66/CFM-SF
75	29/3///// .66/CFM-SF
76	29/4/10/PCT-MCLG///.66/CFM-SF/.66/CFM-SF
77	29/5/10/PCT-MCLG///.66/CFM-SF/.66/CFM-SF
78	29/6///// .66/CFM-SF/.66/CFM-SF
79	29/7///// .66/CFM-SF/.66/CFM-SF
80	29/8///// .66/CFM-SF
81	30/1
82	30/2/1400/CFM/1500/CFM
83	30/3///750/CFM
84	30/4/4950/CFM
85	30/5/3830/CFM
86	SYSTEM - 1
87	39/1/REPLACE FLUORESCENT FIXTURES
88	40/1/SZ
89	41/1/1/2/4/5
90	42/1/1.1/1.1
91	45/1/CBAPCLG/OFF/OFF/OFF/OFF/CBAPHTG/OFF/OFF/OFF/OFF
92	40/2/PTAC
93	41/2/6/7
94	42/2/.2
95	45/2/CBAPCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
96	40/3/RAD
97	41/3/7/8
98	42/3
99	45/3/OFF/OFF/OFF/OFF/OFF/CBAPHTG/OFF/OFF/OFF/OFF
100	40/4/UH
101	41/4/3/6
102	42/4//.2
103	45/4/OFF/OFF/OFF/OFF/OFF/CBAPHTG/OFF/OFF/OFF/OFF
104	EQUIPMENT - 1
105	59/1/CARLISLE///REPLACE FLUORESCENT FIXTURES
106	60/1/1/PKPLANT/1/1
107	60/2/2/PKPLANT/2/2
108	62/1/EQ1161/4
109	62/2/EQ1161/5
110	65/1/1//1/1/3/4
111	67/1/EQ2102/1
112	69/1/EQ4003
113	69/2/EQ4003
114	69/3
115	69/4//EQ4381
116	LOAD - 2

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LINE #	-----
117	19/2/COMBINED ECOS
118	20/1/1/1ST FL OFFICES/8053/1/2/2//11
119	20/2/2/LIQUOR STORE/1127/1/2/2//11
120	20/3/3/LIQUOR STORAGE/901/1/2/2//11
121	20/4/4/LIBRARY/3692/1/2/2//11
122	20/5/5/GAME ROOM/4154/1/2/2//11
123	20/6/6/2ND FL OFFICES/1139/1/2/2//11
124	20/7/7/2ND FL OFFICE/248/1/2/2//11
125	20/8/8/2ND FL TOILETS/582/1/2/2//11
126	21/M////CBADCTX//CBADHTX
127	22/4/1/YES////185
128	22/5/1/YES////185
129	22/6/1/YES////185
130	22/7/1/YES////185
131	22/8/1/YES////185
132	24/1/1/105/8.5//183/35
133	24/1/2/32/8.5//183/125
134	24/1/3/73/8.5//183/215
135	24/1/4/90/8.5//183/305
136	24/2/1/17/8.5//183/35
137	24/2/2/53/8.5//183/125
138	24/2/3/17/8.5//183/215
139	24/3/1/16/8.5//183/215
140	24/4/1/32/8.5//183/125
141	24/4/2/73/8.5//183/215
142	24/4/3/49/8.5//183/305
143	24/5/1/55/8.5//183/305
144	24/5/2/73/8.5//183/35
145	24/5/3/31/8.5//183/125
146	24/6/1/33/8.5//183/35
147	24/6/2/37/8.5//183/125
148	24/7/1/16/8.5//183/125
149	24/7/2/16/8.5//183/215
150	24/8/1/16/8.5//183/215
151	24/8/2/17/8.5//183/305
152	25/1/1/6/4/8/.81/.64
153	25/1/2/6/4/7/.81/.64
154	25/1/3/6/4/6/.81/.64
155	25/1/4/6/4/5/.81/.64
156	25/3/1/6/4/1/.81/.64
157	25/4/1/6/4/4/.81/.64
158	25/4/2/6/4/10/.81/.64
159	25/4/3/6/4/10/.81/.64
160	25/5/1/6/4/10/.81/.64
161	25/5/2/6/4/10/.81/.64
162	25/5/3/6/4/4/.81/.64
163	25/6/1/6/4/4/.81/.64
164	25/6/2/6/4/4/.81/.64
165	25/7/1/6/4/2/.81/.64
166	25/7/2/6/4/2/.81/.64
167	25/8/1/6/4/2/.81/.64
168	25/8/2/6/4/2/.81/.64
169	26/1/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPFAN/OFF/OFF/OFF/OFF
170	26/2/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPFAN/OFF/OFF/OFF/OFF
171	26/3/CBAP&L/CBAP&L/CBAP&L//OFF/OFF/CBAPHTG/OFF/OFF/OFF
172	26/4/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPCLG/CBAPHTG/OFF/OFF/OFF
173	26/5/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPCLG/CBAPHTG/OFF/OFF/OFF
174	26/6/CBAP&L/CBAP&L/CBAP&L//OFF/CBAPCLG/CBAPHTG/OFF/OFF/OFF

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LINE #	-----
175	26/7/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/OFF/OFF/OFF/OFF
176	26/8/OFF/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF
177	27/M/280/SF-PERS/285/290/1.5/WATT-SF
178	29/1/15/PCT-MCLG/15/PCT-MHTG/.51/CFM-SF/.51/CFM-SF
179	29/2/////51/CFM-SF/.51/CFM-SF
180	29/3/////51/CFM-SF
181	29/4/10/PCT-MCLG///.51/CFM-SF/.51/CFM-SF
182	29/5/10/PCT-MCLG///.51/CFM-SF/.51/CFM-SF
183	29/6/////51/CFM-SF/.51/CFM-SF
184	29/7/////51/CFM-SF/.51/CFM-SF
185	29/8/////51/CFM-SF
186	30/1
187	30/2/1400/CFM/1500/CFM
188	30/3///750/CFM
189	30/4/4950/CFM
190	30/5/3830/CFM
191	SYSTEM - 2
192	39/2/COMBINED ECOS
193	40/1/SZ
194	41/1/1/2/4/5
195	42/1/1.1/1.1
196	45/1/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
197	40/2/PTAC
198	41/2/6/7
199	42/2/.2
200	45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
201	40/3/RAD
202	41/3/7/8
203	42/3
204	45/3/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
205	40/4/UH
206	41/4/3/6
207	42/4//.2
208	45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
209	EQUIPMENT - 2
210	59/2/CARLISLE///COMBINED ECOS
211	60/1/1/PKPLANT/1/1
212	60/2/2/PKPLANT/2/2
213	62/1/EQ1161/4
214	62/2/EQ1161/5
215	65/1/1//1/1/3/4
216	67/1/EQ2102/1
217	69/1/EQ4003
218	69/2/EQ4003
219	69/3
220	69/4//EQ4381

Building 046

Trace Output File

933702

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**          T R A C E    6 0 0    A N A L Y S I S          **  
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**          by          **  
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 46

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Relectance: 0.20
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 13:34:17 1/13/94
Dataset Name: CB46 .TM

AIRFLOW - ALTERNATIVE 1
BASE BUILDING

----- S Y S T E M S U M M A R Y -----
(Design Airflow Quantities)

System Number	System Type	Main					Auxil. Supply	Room Exhaust
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Airflow (Cfm)	Airflow (Cfm)
1	SZ	1,847	16,641	16,741	20,668	5,774	0	0
2	PTAC	0	1,735	1,735	2,307	572	0	0
3	RAD	0	0	0	0	365	0	0
4	UH	0	0	6,035	0	2,238	0	0
Totals		1,847	18,376	24,511	22,975	8,949	0	0

CAPACITY - ALTERNATIVE 1
BASE BUILDING

----- S Y S T E M S U M M A R Y -----
(Design Capacity Quantities)

System Number	System Type	Cooling				Heating						
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	SZ	50.2	0.0	0.0	50.2	-665,874	0	-59,698	0	0	0	-665,874
2	PTAC	6.3	0.0	0.0	6.3	-85,408	0	0	0	0	0	-85,408
3	RAD	0.0	0.0	0.0	0.0	-49,312	0	0	0	0	0	-49,312
4	UH	0.0	0.0	0.0	0.0	-349,136	0	0	0	0	0	-349,136
Totals		56.5	0.0	0.0	56.5	-1,149,729	0	-59,698	0	0	0	-1,149,729

The building peaked at hour 16 month 7 with a capacity of 56.1 tons

ENGINEERING CHECKS - ALTERNATIVE 1
BASE BUILDING

----- E N G I N E E R I N G C H E C K S -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	Cooling				Heating		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	SZ	11.10	0.98	331.3	339.0	35.40	0.98	-39.11	17,026
2	Main	PTAC	0.00	1.25	277.2	221.6	54.15	1.25	-61.58	1,387
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-59.41	830
4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.61	-35.32	9,886

System 1 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads						*			*			
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	124,323		124,323	20.63	*	0	0.00	*	0	-90,278	16.49
Glass Solar	70,848	0		70,848	11.75	*	73,968	21.71	*	0	0	0.00
Glass Cond	19,448	0		19,448	3.23	*	19,852	5.83	*	-95,233	-95,233	17.40
Wall Cond	18,393	3,709		22,102	3.67	*	19,556	5.74	*	-67,914	-88,336	16.14
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	152,805			152,805	25.35	*	66,238	19.44	*	-273,498	-273,498	49.97
Sub Total==>	261,494	128,032		389,526	64.63	*	179,614	52.72	*	-436,645	-547,345	100.00
Internal Loads						*			*			
Lights	113,020	0		113,020	18.75	*	116,503	34.20	*	0	0	0.00
People	32,428			32,428	5.38	*	15,332	4.50	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	145,449	0	0	145,449	24.13	*	131,835	38.70	*	0	0	0.00
Ceiling Load	42,074	-42,074		0	0.00	*	31,886	9.36	*	-29,366	0	0.00
Outside Air	0	0	0	73,703	12.23	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				13,017	2.16	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	-2,662			-2,662	-0.44	*	-2,662	-0.78	*	0	0	-0.00
Exhaust Heat		-16,318	0	-16,318	-2.71	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	446,355	69,640	0	602,714	100.00	*	340,673	100.00	*	-466,011	-547,345	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total Floor Part ExFlr Roof Wall	Glass (sf)	(%)
Main Clg	50.2	602.7	16,641	83.7 66.7 73.2	55.5 54.8 64.5	17,026		
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0		
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	50.2	602.7				7,846	0	0
						5,950	1,776	30

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	Clg % OA	11.1	Type	Clg	Htg
Main Htg	-665.9	16,741	57.0	93.6	Vent	1,847	0	Clg Cfm/Sqft	0.98	SADB	56.2	93.6
Aux Htg	0.0	0	0.0	0.0	Infil	3,927	3,927	Clg Cfm/Ton	331.31	Plenum	82.8	58.6
Preheat	-59.7	16,641	52.2	55.5	Supply	16,641	16,741	Clg Sqft/Ton	338.99	Return	82.9	58.2
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	35.40	Ret/OA	83.7	58.2
Humidif	0.0	0	0.0	0.0	Return	16,641	16,741	No. People	61	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	1,847	0	Htg % OA	0.0	Fn MtrTD	0.2	0.2
Total	-665.9				Rm Exh	0	0	Htg Cfm/Sqft	0.98	Fn BldTD	0.1	0.1
					Auxil	0	0	Htg Btuh/Sqft	-39.11	Fn Frict	0.4	0.4

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/15 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	21,360		21,360	28.44	*	0	0.00	*	0	-17,749	20.81
Glass Solar	11,232	0		11,232	14.95	*	10,944	26.48	*	0	0	0.00
Glass Cond	3,009	0		3,009	4.01	*	3,180	7.70	*	-15,443	-15,443	18.11
Wall Cond	2,731	564		3,295	4.39	*	2,977	7.21	*	-9,254	-12,231	14.34
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	24,717			24,717	32.91	*	9,865	23.87	*	-39,853	-39,853	46.73
Sub Total==>	41,690	21,923		63,613	84.70	*	26,967	65.26	*	-64,550	-85,276	100.00
Internal Loads												
Lights	8,687	0		8,687	11.57	*	8,914	21.57	*	0	0	0.00
People	2,558			2,558	3.41	*	1,167	2.82	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	11,246	0	0	11,246	14.97	*	10,081	24.40	*	0	0	0.00
Ceiling Load	3,880	-3,880		0	0.00	*	4,275	10.35	*	-3,916	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				247	0.33	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	56,816	18,043	0	75,106	100.00	*	41,323	100.00	*	-68,466	-85,276	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf) (%)	
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor	Part
Main Clg	6.3	75.1	58.6	1,735	83.6	65.3	66.5	53.0	50.5	52.0	1,387	0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0	0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0	0
Totals	6.3	75.1									1,387	0
											867	288 33

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	ENGINEERING CHECKS--		TEMPERATURES (F)---		
	(Mbh)	(cfm)	Deg F	Deg F				Clg % OA	0.0	Type	Clg	Htg
Main Htg	-85.4	1,735	59.0	104.3	Vent	0	0	Clg Cfm/Sqft	1.25	SADB	53.1	104.3
Aux Htg	0.0	0	0.0	0.0	Infil	572	572	Clg Cfm/Ton	277.24	Plenum	83.8	59.1
Preheat	-0.0	1,735	59.0	53.0	Supply	1,735	1,735	Clg Sqft/Ton	221.61	Return	83.6	59.0
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	54.15	Ret/OA	83.6	59.0
Humidif	0.0	0	0.0	0.0	Return	1,735	1,735	No. People	5	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-85.4				Rm Exh	0	0	Htg Cfm/Sqft	1.25	Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/Sqft	-61.58	Fn Frict	0.1	0.0

System 3 Block RAD - RADIATION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	-6,714	13.61
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-10,295	-10,295	20.88
Wall Cond	0	0		0	0.00	*	0	0.00	*	-5,711	-6,907	14.01
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-25,396	-25,396	51.50
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-41,403	-49,312	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	-7,805	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-49,208	-49,312	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total Floor	Glass (sf) (%)
Main Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	830	
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0	
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0	
Totals	0.0	0.0				830	0 0
						Wall	553 192 35

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
Main Htg	-49.3	0	0.0	0.0	Vent	0	0	Clg Cfm/Sqft	0.00	SADB	0.0	68.1
Aux Htg	0.0	0	0.0	0.0	Infil	0	365	Clg Cfm/Ton	0.00	Plenum	0.0	38.8
Preheat	0.0	0	0.0	0.0	Supply	0	0	Clg Sqft/Ton	0.00	Return	0.0	39.0
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	39.0
Humidif	0.0	0	0.0	0.0	Return	0	0	No. People	0	Runarnd	0.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-49.3				Rm Exh	0	0	Htg Cfm/Sqft	0.00	Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/Sqft	-59.41	Fn Frict	0.0	0.0

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 4 Block UH - UNIT HEATERS

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	-74,057	21.67
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-73,355	-73,355	21.47
Wall Cond	0	0		0	0.00	*	0	0.00	*	-30,899	-38,407	11.24
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-155,894	-155,894	45.62
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-260,148	-341,713	100.00
Internal Loads												
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	-84,880	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat PkUp		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-345,028	-341,713	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	9,886		
Aux Clg	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Opt Vent	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	0.0	0.0				8,985	0	0
						3,392	1,368	40

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent	0	0	Clg Cfm/Sqft	0.00	SADB	0.0	120.5
Main Htg	-349.1	6,035	67.4	120.5	Infil	0	2,238	Clg Cfm/Ton	0.00	Plenum	0.0	39.6
Aux Htg	0.0	0	0.0	0.0	Supply	0	6,035	Clg Sqft/Ton	0.00	Return	0.0	68.0
Preheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	68.0
Reheat	0.0	0	0.0	0.0	Return	0	6,035	No. People	0	Runarnd	0.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	0.61	Fn BldTD	0.0	0.0
Total	-349.1				Auxil	0	0	Htg Btuh/Sqft	-35.32	Fn Frict	0.0	0.1

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

BUILDING U-VALUES - ALTERNATIVE 1
BASE BUILDING

----- B U I L D I N G U - V A L U E S -----

Room Number	Description	Part.	ExFlr	Room U-Values (Btu/hr/sqft/F)							Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
				Summr Skylt	Wintr Skylt	Summr Roof	Wintr Windo	Summr Windo	Wall	Ceil.		
1	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	45.0	9.63
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	45.0	9.63
2	LIQUOR STORE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.343	0.317	100.3	21.77
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.343	0.317	100.3	21.77
4	LIBRARY	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
5	GAME ROOM	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	49.2	10.88
6	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
7	2ND FL OFFICE	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	75.9	17.16
7	2ND FL OFFICE	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
8	2ND FL TOILETS	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	62.6	14.24
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	62.6	14.24
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	78.1	17.65
3	LIQUOR STORAGE	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	29.8	6.29
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	29.8	6.29
4	LIBRARY	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
5	GAME ROOM	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
6	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
System	4 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	47.0	10.75
Building		0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	50.5	11.33

BUILDING AREAS - ALTERNATIVE 1
BASE BUILDING

----- B U I L D I N G A R E A S -----													
Room Number	Description	Number of Duplicate		Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	1ST FL OFFICES	1	1	8,053	8,053	0	0	0	0	0	624	24	1,926
Zone	1 Total/Ave.				8,053	0	0	0	0	0	624	24	1,926
2	LIQUOR STORE	1	1	1,127	1,127	0	0	0	0	0	0	0	739
Zone	2 Total/Ave.				1,127	0	0	0	0	0	0	0	739
4	LIBRARY	1	1	3,692	3,692	0	0	0	0	3,692	576	44	733
Zone	4 Total/Ave.				3,692	0	0	0	0	3,692	576	44	733
5	GAME ROOM	1	1	4,154	4,154	0	0	0	0	4,154	576	43	775
Zone	5 Total/Ave.				4,154	0	0	0	0	4,154	576	43	775
System	1 Total/Ave.				17,026	0	0	0	0	7,846	1,776	30	4,174
6	2ND FL OFFICES	1	1	1,139	1,139	0	0	0	0	1,139	192	32	403
Zone	6 Total/Ave.				1,139	0	0	0	0	1,139	192	32	403
7	2ND FL OFFICE	1	1	248	248	0	0	0	0	248	96	35	176
Zone	7 Total/Ave.				248	0	0	0	0	248	96	35	176
System	2 Total/Ave.				1,387	0	0	0	0	1,387	288	33	579
7	2ND FL OFFICE	1	1	248	248	0	0	0	0	248	96	35	176
Zone	7 Total/Ave.				248	0	0	0	0	248	96	35	176
8	2ND FL TOILETS	1	1	582	582	0	0	0	0	582	96	34	184
Zone	8 Total/Ave.				582	0	0	0	0	582	96	34	184
System	3 Total/Ave.				830	0	0	0	0	830	192	35	360
3	LIQUOR STORAGE	1	1	901	901	0	0	0	0	0	24	18	112
Zone	3 Total/Ave.				901	0	0	0	0	0	24	18	112
4	LIBRARY	1	1	3,692	3,692	0	0	0	0	3,692	576	44	733
Zone	4 Total/Ave.				3,692	0	0	0	0	3,692	576	44	733
5	GAME ROOM	1	1	4,154	4,154	0	0	0	0	4,154	576	43	775
Zone	5 Total/Ave.				4,154	0	0	0	0	4,154	576	43	775
6	2ND FL OFFICES	1	1	1,139	1,139	0	0	0	0	1,139	192	32	403
Zone	6 Total/Ave.				1,139	0	0	0	0	1,139	192	32	403
System	4 Total/Ave.				9,886	0	0	0	0	8,985	1,368	40	2,023
Building					29,129	0	0	0	0	19,048	3,624	34	7,137

ASHRAE 90 ANALYSIS - ALTERNATIVE 1
BASE BUILDING

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.232 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.500 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.329 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 18.58 (Btu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTVw) = 33.33 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1
BASE BUILDING

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	2.8	1	8	-60,471	26	594	1,225.6	0	0	0.0	0	0
5 - 10	5.6	3	27	-120,943	30	680	2,451.1	0	0	0.0	0	0
10 - 15	8.5	10	83	-181,414	17	376	3,676.7	0	0	0.0	0	0
15 - 20	11.3	8	63	-241,885	2	56	4,902.2	0	0	0.0	0	0
20 - 25	14.1	1	8	-302,357	1	23	6,127.8	59	3,638	0.0	0	0
25 - 30	16.9	16	128	-362,828	2	52	7,353.3	0	0	0.0	0	0
30 - 35	19.8	2	18	-423,300	0	6	8,578.9	0	0	0.0	0	0
35 - 40	22.6	7	54	-483,771	2	42	9,804.5	0	0	0.0	0	0
40 - 45	25.4	7	60	-544,242	2	43	11,030.0	0	0	0.0	0	0
45 - 50	28.2	6	46	-604,714	0	3	12,255.6	0	0	0.0	0	0
50 - 55	31.1	8	63	-665,185	1	28	13,481.1	0	0	0.0	0	0
55 - 60	33.9	8	67	-725,656	16	363	14,706.7	24	1,450	0.0	0	0
60 - 65	36.7	3	23	-786,128	0	0	15,932.2	0	0	0.0	0	0
65 - 70	39.5	5	39	-846,599	0	0	17,157.8	0	0	0.0	0	0
70 - 75	42.4	10	83	-907,071	0	0	18,383.4	10	634	0.0	0	0
75 - 80	45.2	2	15	-967,542	0	0	19,608.9	7	436	0.0	0	0
80 - 85	48.0	1	5	-1,028,013	0	0	20,834.5	0	0	0.0	0	0
85 - 90	50.8	2	20	-1,088,485	0	0	22,060.0	0	0	0.0	0	0
90 - 95	53.7	0	0	-1,148,956	0	0	23,285.6	0	0	0.0	0	0
95 - 100	56.5	0	0	-1,209,427	0	0	24,511.1	0	0	0.0	0	0
Hours Off	0.0	0	7,950	0	0	6,494	0.0	0	2,602	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1
BASE BUILDING

----- B U I L D I N G T E M P E R A T U R E P R O F I L E S -----													
Temperature Range (F)	----- Zone Number -----												
	1	2	4	5	6	7	7	8	3	4	5	6	
Max. Temp.	83.5	81.1	89.9	89.0	87.3	87.5	104.5	104.9	132.3	110.0	109.1	105.1	
Mo./Hr.	7 19	7 21	7 20	7 20	7 20	7 20	8 20	7 19	8 18	7 19	7 19	7 19	
Day Type	4	4	4	4	4	4	1	2	2	2	2	2	
..... Number of Hours													
Above 100	0	0	0	0	0	0	620	749	2,960	1,340	1,147	769	
95 - 100	0	0	0	0	0	0	1,376	954	319	902	701	951	
90 - 95	0	0	0	0	0	0	746	874	403	663	845	860	
85 - 90	0	0	224	169	110	132	475	475	430	597	572	473	
80 - 85	903	274	1,483	1,312	1,020	1,079	455	620	315	170	351	619	
75 - 80	2,372	2,561	1,742	1,831	2,224	2,246	34	0	691	51	56	0	
70 - 75	910	888	584	411	352	385	431	388	1,277	699	488	168	
65 - 70	1,991	2,211	573	639	486	452	1,883	1,861	1,280	1,736	1,713	1,966	
60 - 65	984	1,240	732	575	704	990	1,017	1,069	366	941	922	1,067	
55 - 60	595	731	640	747	639	543	760	760	275	703	822	779	
50 - 55	391	332	912	658	778	826	963	1,010	444	958	1,143	1,108	
Below 50	614	523	1,870	2,418	2,447	2,107	0	0	0	0	0	0	
Min. Temp.	37.1	39.1	34.6	32.3	33.3	36.2	54.9	54.9	54.9	54.9	54.9	54.9	
Mo./Hr.	2 7	2 7	2 10	2 10	2 8	2 10	1 6	1 6	1 2	1 6	1 5	1 5	
Day Type	5	5	4	4	5	4	2	2	4	2	2	2	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1
BASE BUILDING

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	HOT WTR On Peak (Therm)	HOT W DMND On Peak (Thrm/hr)
Jan	14,233	74	1,247	7
Feb	12,878	74	1,190	7
March	15,582	74	644	7
April	13,545	74	122	7
May	17,602	155	0	0
June	22,034	160	0	0
July	24,623	164	0	0
Aug	23,101	160	0	0
Sept	16,020	156	0	0
Oct	14,898	74	96	7
Nov	13,548	74	433	7
Dec	13,555	74	1,000	7
Total	201,620	164	4,731	7

Building Energy Consumption = 39,866 (Btu/Sq Ft/Year)
Source Energy Consumption = 92,535 (Btu/Sq Ft/Year)

Floor Area = 29,129 (Sq Ft)

----- EQUIPMENT ENERGY CONSUMPTION -----

Ref Num	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	13433	12154	14712	12793	14073	14073	12793	14712	12793	14073	12793	12793	161,198
	PK	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9
1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTW20	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1161	AIR-CLD COND COMP <15 TONS												
	ELEC	0	0	0	0	1441	4989	8244	5249	1320	0	0	0	21,243
	PK	0.0	0.0	0.0	0.0	64.7	67.3	69.6	67.5	65.0	0.0	0.0	0.0	69.6
1	EQ5200	CONDENSER FANS												
	ELEC	0	0	0	0	148	457	799	488	139	0	0	0	2,032
	PK	0.0	0.0	0.0	0.0	3.9	5.3	6.2	5.2	3.9	0.0	0.0	0.0	6.2
1	EQ5303	CONTROLS												
	ELEC	0	0	0	0	24	66	60	69	22	0	0	0	241
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
2	EQ1161	AIR-CLD COND COMP <15 TONS												
	ELEC	0	0	0	0	119	572	975	618	113	0	0	0	2,398
	PK	0.0	0.0	0.0	0.0	8.0	8.4	8.7	8.4	8.1	0.0	0.0	0.0	8.7
2	EQ5200	CONDENSER FANS												
	ELEC	0	0	0	0	13	53	95	58	12	0	0	0	231
	PK	0.0	0.0	0.0	0.0	0.4	0.7	0.8	0.6	0.5	0.0	0.0	0.0	0.8
2	EQ5303	CONTROLS												

[illegible]

UTILITY PEAK CHECKSUMS - ALTERNATIVE 1
BASE BUILDING

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 163.7 (kW)

Yearly Time of Peak 15 (hr) 7 (mo)

Hour 15 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Perct Of Tot (%)
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Cooling Equipment

1	EQ1161	AIR-CLD COND COMP <15 TONS	76.1	46.47
2	EQ1161	AIR-CLD COND COMP <15 TONS	9.7	5.95

Sub Total			85.8	52.42
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Sub Total			0.0	0.00
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Air Moving Equipment

1		SUMMATION OF FAN ELECTRICAL DEMAND	7.8	4.79
2		SUMMATION OF FAN ELECTRICAL DEMAND	0.1	0.09

Sub Total			8.0	4.88
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Sub Total			0.0	0.00
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Miscellaneous

Lights			69.9	42.71
Base Utilities			0.0	0.00
Misc Equipment			0.0	0.00
Sub Total			69.9	42.71

Grand Total			163.7	100.00
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**          T R A C E    6 0 0    A N A L Y S I S          **
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 46

Weather File Code:	CARLISLE
Location:	ENERGY SAVINGS OPPORTUNITY STUDY
Latitude:	40.2 (deg)
Longitude:	77.2 (deg)
Time Zone:	5
Elevation:	475 (ft)
Barometric Pressure:	29.2 (in. Hg)
Summer Clearness Number:	1.00
Winter Clearness Number:	1.00
Summer Design Dry Bulb:	92 (F)
Summer Design Wet Bulb:	72 (F)
Winter Design Dry Bulb:	4 (F)
Summer Ground Reflectance:	0.20
Winter Ground Reflectance:	0.20
Air Density:	0.0742 (Lbm/cuft)
Air Specific Heat:	0.2444 (Btu/lbm/F)
Density-Specific Heat Prod:	1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor:	4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor:	4.4519 (Lb-min./hr/cuft)
Design Simulation Period:	May To September
System Simulation Period:	January To December
Cooling Load Methodology:	CLTD/CLF (Transfer Function Method)
Time/Date Program was Run:	14: 6:20 1/13/94
Dataset Name:	CB46 .TM

AIRFLOW - ALTERNATIVE 2
WALL & ROOF INSULATION

----- S Y S T E M S U M M A R Y -----

(Design Airflow Quantities)

System Number	System Type	Main					Auxil. Supply	Room Exhaust
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Airflow (Cfm)	Airflow (Cfm)
1	SZ	1,684	15,551	15,651	18,685	4,718	0	0
2	PTAC	0	1,402	1,402	1,844	442	0	0
3	RAD	0	0	0	0	282	0	0
4	UH	0	0	4,192	0	1,730	0	0
Totals		1,684	16,952	21,244	20,529	7,172	0	0

CAPACITY - ALTERNATIVE 2
WALL & ROOF INSULATION

----- S Y S T E M S U M M A R Y -----

(Design Capacity Quantities)

System Number	System Type	Cooling				Heating						
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Sys. Opt. Capacity (Tons)	Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)
1	SZ	37.4	0.0	0.0	0.0	37.4	-373,976	0	0	0	0	0
2	PTAC	4.1	0.0	0.0	0.0	4.1	-52,014	0	0	0	0	0
3	RAD	0.0	0.0	0.0	0.0	0.0	-33,113	0	0	0	0	0
4	UH	0.0	0.0	0.0	0.0	0.0	-223,775	0	0	0	0	0
Totals		41.5	0.0	0.0	0.0	41.5	-682,878	0	0	0	0	0

The building peaked at hour 16 month 7 with a capacity of 41.1 tons

ENGINEERING CHECKS - ALTERNATIVE 2
WALL & ROOF INSULATION

----- E N G I N E E R I N G C H E C K S -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	Cooling				Heating		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	SZ	10.83	0.91	415.3	454.7	26.39	0.92	-21.96	17,026
2	Main	PTAC	0.00	1.01	344.2	340.6	35.23	1.01	-37.50	1,387
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-39.90	830
4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.42	-22.64	9,886

System 1 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/16 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	23,745		23,745	5.28	*	0	0.00	*	0	-19,416	5.69
Glass Solar	70,848	0		70,848	15.77	*	73,968	25.82	*	0	0	0.00
Glass Cond	19,448	0		19,448	4.33	*	19,852	6.93	*	-95,233	-95,233	27.90
Wall Cond	3,242	1,046		4,289	0.95	*	3,301	1.15	*	-11,470	-15,344	4.50
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	112,335			112,335	25.00	*	51,389	17.94	*	-211,340	-211,340	61.92
Sub Total==>	205,873	24,791		230,664	51.33	*	148,510	51.85	*	-318,043	-341,332	100.00
Internal Loads						*			*			
Lights	112,625	0		112,625	25.06	*	116,108	40.54	*	0	0	0.00
People	32,391			32,391	7.21	*	15,271	5.33	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	145,016	0	0	145,016	32.27	*	131,380	45.87	*	0	0	0.00
Ceiling Load	8,029	-8,029		0	0.00	*	6,537	2.28	*	-5,836	0	0.00
Outside Air	0	0	0	64,425	14.34	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				12,164	2.71	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		-2,905	0	-2,905	-0.65	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	358,918	13,857	0	449,364	100.00	*	286,427	100.00	*	-323,878	-341,332	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor		
Main Clg	37.4	449.4	334.6	15,551	78.0	65.4	75.9	57.4	56.0	66.7	17,026	
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0	
Totals	37.4	449.4									7,846	0 0
											5,950	1,776 30

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	ENGINEERING CHECKS--		TEMPERATURES (F)---		
	(Mbh)	(cfm)	Deg F	Deg F				Clg % OA	10.8	Type	Clg	Htg
Main Htg	-374.0	15,651	65.1	87.0	Vent	1,684	0	Clg Cfm/Sqft	0.91	SADB	58.1	87.0
Aux Htg	0.0	0	0.0	0.0	Infil	3,035	3,035	Clg Cfm/Ton	415.27	Plenum	76.5	65.7
Preheat	-0.0	15,551	58.8	57.4	Supply	15,551	15,651	Clg Sqft/Ton	454.67	Return	76.5	65.4
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	26.39	Ret/OA	78.0	65.4
Humidif	0.0	0	0.0	0.0	Return	15,551	15,651	No. People	61	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	1,684	0	Htg % OA	0.0	Fn MtrTD	0.2	0.2
Total	-374.0				Rm Exh	0	0	Htg Cfm/Sqft	0.92	Fn BldTD	0.1	0.1
					Auxil	0	0	Htg Btuh/Sqft	-21.96	Fn Frict	0.4	0.4

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/15 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	3,463		3,463	7.09	*	0	0.00	*	0	-3,531	6.80
Glass Solar	11,232	0		11,232	22.98	*	10,944	32.93	*	0	0	0.00
Glass Cond	3,009	0		3,009	6.16	*	3,180	9.57	*	-15,443	-15,443	29.76
Wall Cond	462	158		620	1.27	*	483	1.45	*	-1,563	-2,128	4.10
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	19,100			19,100	39.08	*	7,623	22.94	*	-30,795	-30,795	59.34
Sub Total==>	33,803	3,620		37,423	76.58	*	22,231	66.90	*	-47,801	-51,898	100.00
Internal Loads						*			*			
Lights	8,687	0		8,687	17.78	*	8,914	26.83	*	0	0	0.00
People	2,558			2,558	5.24	*	1,167	3.51	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	11,246	0	0	11,246	23.01	*	10,081	30.34	*	0	0	0.00
Ceiling Load	762	-762		0	0.00	*	917	2.76	*	-917	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				199	0.41	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OY/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	45,811	2,858	0	48,668	100.00	*	33,229	100.00	*	-48,718	-51,898	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor		
Main Clg	4.1	48.9	35.8	1,402	76.7	63.0	66.5	53.1	50.9	53.2	1,387	
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0	
Totals	4.1	48.9									1,387	
											0	
											0	
											1,387	0 0
											867	288 33

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	--ENGINEERING CHECKS--		--TEMPERATURES (F)---		
	(Mbh)	(cfm)	Deg F	Deg F	Vent			Clg % OA	0.0	Type	Clg	Htg
Main Htg	-52.0	1,402	65.8	99.9	Infil	442	442	Clg Cfm/Sqft	1.01	SADB	53.2	99.9
Aux Htg	0.0	0	0.0	0.0	Supply	1,402	1,402	Clg Cfm/Ton	344.18	Plenum	76.7	65.9
Preheat	-0.0	1,402	65.9	53.1	Mincfm	0	0	Clg Sqft/Ton	340.59	Return	76.7	65.9
Reheat	0.0	0	0.0	0.0	Return	1,402	1,402	Clg Btuh/Sqft	35.23	Ret/OA	76.7	65.9
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	No. People	5	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-52.0				Auxil	0	0	Htg Cfm/Sqft	1.01	Fn BldTD	0.0	0.0
								Htg Btuh/Sqft	-37.50	Fn Frict	0.1	0.0

System 3 Block RAD - RADIATION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1

Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	-1,904	5.75
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-10,295	-10,295	31.09
Wall Cond	0	0		0	0.00	*	0	0.00	*	-965	-1,289	3.89
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-19,624	-19,624	59.26
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-30,884	-33,113	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	-2,221	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-33,105	-33,113	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
				Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor	830	
Main Clg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Part	0	
Aux Clg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0	
Opt Vent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	830	0 0
Totals	0.0	0.0								Wall	553	192 35

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	--ENGINEERING CHECKS--		--TEMPERATURES (F)--		
								Clg % OA	0.0	Type	Clg	Htg
Main Htg	-33.1	0	0.0	0.0	Vent	0	0	Clg Cfm/Sqft	0.00	SADB	0.0	68.1
Aux Htg	0.0	0	0.0	0.0	Infil	0	282	Clg Cfm/Ton	0.00	Plenum	0.0	59.8
Preheat	0.0	0	0.0	0.0	Supply	0	0	Clg Sqft/Ton	0.00	Return	0.0	59.9
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	59.9
Humidif	0.0	0	0.0	0.0	Return	0	0	No. People	0	Runarnd	0.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-33.1				Rm Exh	0	0	Htg Cfm/SqFt	0.00	Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/SqFt	-39.90	Fn Frict	0.0	0.0

System 4 Block UH - UNIT HEATERS

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Percent Of Tot (%)	*	Space Sensible (Btuh)	Percent Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Percent Of Tot (%)
Envelope Loads						*			*			
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	-20,721	9.34
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-73,355	-73,355	33.08
Wall Cond	0	0		0	0.00	*	0	0.00	*	-5,219	-7,222	3.26
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-120,464	-120,464	54.32
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-199,037	-221,762	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	-22,976	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-222,013	-221,762	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total Floor	Glass (sf)	(%)
Main Clg	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	Part	0	
Aux Clg	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	0	
Opt Vent	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	Roof	8,985	0 0
Totals	0.0	0.0				Wall	3,392	1,368 40

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
Main Htg	-223.8	4,192	67.6	116.7	Vent	0	0	Clg Cfm/Sqft	0.00	SADB	0.0	116.7
Aux Htg	0.0	0	0.0	0.0	Infil	0	1,730	Clg Cfm/Ton	0.00	Plenum	0.0	60.1
Preheat	0.0	0	0.0	0.0	Supply	0	4,192	Clg Sqft/Ton	0.00	Return	0.0	68.0
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	68.0
Humidif	0.0	0	0.0	0.0	Return	0	4,192	No. People	0	Runarnd	0.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-223.8				Rm Exh	0	0	Htg Cfm/Sqft	0.42	Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/Sqft	-22.64	Fn Frict	0.0	0.1

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

BUILDING U-VALUES - ALTERNATIVE 2
WALL & ROOF INSULATION

----- B U I L D I N G U - V A L U E S -----

Room Number	Description	Room U-Values (Btu/hr/sqft/F)									Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
		Part.	ExFlr	Summr Skylt	Wintr Skylt	Roof	Summr Windo	Wintr Windo	Wall	Ceil.		
1	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.317	45.6	9.75
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.317	45.6	9.75
2	LIQUOR STORE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.058	0.317	101.9	22.09
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.058	0.317	101.9	22.09
4	LIBRARY	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	48.3	11.08
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	48.3	11.08
5	GAME ROOM	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	46.7	10.73
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	46.7	10.73
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	50.2	11.09
6	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	69.3	15.68
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	69.3	15.68
7	2ND FL OFFICE	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	117.3	26.22
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	117.3	26.22
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	77.9	17.56
7	2ND FL OFFICE	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	117.3	26.22
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	117.3	26.22
8	2ND FL TOILETS	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	64.3	14.59
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	64.3	14.59
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	80.2	18.06
3	LIQUOR STORAGE	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.317	30.1	6.35
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.317	30.1	6.35
4	LIBRARY	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	48.3	11.08
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	48.3	11.08
5	GAME ROOM	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	46.7	10.73
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	46.7	10.73
6	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	69.3	15.68
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	69.3	15.68
System	4 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	48.4	11.03
Building		0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	51.8	11.58

BUILDING AREAS - ALTERNATIVE 2
WALL & ROOF INSULATION

----- B U I L D I N G A R E A S -----													
Room Number	Description	Number of Duplicate Flr	Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
Zone	1 1ST FL OFFICES	1	1	8,053	8,053	0	0	0	0	0	624	24	1,926
	1 Total/Ave.				8,053	0	0	0	0	0	624	24	1,926
Zone	2 LIQUOR STORE	1	1	1,127	1,127	0	0	0	0	0	0	0	739
	2 Total/Ave.				1,127	0	0	0	0	0	0	0	739
Zone	4 LIBRARY	1	1	3,692	3,692	0	0	0	0	3,692	576	44	733
	4 Total/Ave.				3,692	0	0	0	0	3,692	576	44	733
Zone	5 GAME ROOM	1	1	4,154	4,154	0	0	0	0	4,154	576	43	775
	5 Total/Ave.				4,154	0	0	0	0	4,154	576	43	775
System	1 Total/Ave.				17,026	0	0	0	0	7,846	1,776	30	4,174
Zone	6 2ND FL OFFICES	1	1	1,139	1,139	0	0	0	0	1,139	192	32	403
	6 Total/Ave.				1,139	0	0	0	0	1,139	192	32	403
Zone	7 2ND FL OFFICE	1	1	248	248	0	0	0	0	248	96	35	176
	7 Total/Ave.				248	0	0	0	0	248	96	35	176
System	2 Total/Ave.				1,387	0	0	0	0	1,387	288	33	579
Zone	7 2ND FL OFFICE	1	1	248	248	0	0	0	0	248	96	35	176
	7 Total/Ave.				248	0	0	0	0	248	96	35	176
Zone	8 2ND FL TOILETS	1	1	582	582	0	0	0	0	582	96	34	184
	8 Total/Ave.				582	0	0	0	0	582	96	34	184
System	3 Total/Ave.				830	0	0	0	0	830	192	35	360
Zone	3 LIQUOR STORAGE	1	1	901	901	0	0	0	0	0	24	18	112
	3 Total/Ave.				901	0	0	0	0	0	24	18	112
Zone	4 LIBRARY	1	1	3,692	3,692	0	0	0	0	3,692	576	44	733
	4 Total/Ave.				3,692	0	0	0	0	3,692	576	44	733
Zone	5 GAME ROOM	1	1	4,154	4,154	0	0	0	0	4,154	576	43	775
	5 Total/Ave.				4,154	0	0	0	0	4,154	576	43	775
Zone	6 2ND FL OFFICES	1	1	1,139	1,139	0	0	0	0	1,139	192	32	403
	6 Total/Ave.				1,139	0	0	0	0	1,139	192	32	403
System	4 Total/Ave.				9,886	0	0	0	0	8,985	1,368	40	2,023
Building					29,129	0	0	0	0	19,048	3,624	34	7,137

ASHRAE 90 ANALYSIS - ALTERNATIVE 2
WALL & ROOF INSULATION

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.041 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.311 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.139 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 2.27 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTVw) = 32.24 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2
WALL & ROOF INSULATION

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	2.1	6	54	-34,144	27	468	1,062.2	0	0	0.0	0	0
5 - 10	4.2	5	50	-68,288	23	410	2,124.4	0	0	0.0	0	0
10 - 15	6.2	6	58	-102,432	17	307	3,186.6	0	0	0.0	0	0
15 - 20	8.3	6	61	-136,576	1	10	4,248.8	59	3,638	0.0	0	0
20 - 25	10.4	5	48	-170,720	3	55	5,311.0	0	0	0.0	0	0
25 - 30	12.5	8	75	-204,863	1	23	6,373.2	0	0	0.0	0	0
30 - 35	14.5	10	99	-239,007	1	25	7,435.4	0	0	0.0	0	0
35 - 40	16.6	4	36	-273,151	2	37	8,497.5	0	0	0.0	0	0
40 - 45	18.7	7	64	-307,295	0	8	9,559.7	0	0	0.0	0	0
45 - 50	20.8	10	94	-341,439	0	0	10,621.9	0	0	0.0	0	0
50 - 55	22.8	2	18	-375,583	2	42	11,684.1	24	1,450	0.0	0	0
55 - 60	24.9	6	60	-409,727	2	42	12,746.3	0	0	0.0	0	0
60 - 65	27.0	5	50	-443,871	19	338	13,808.5	0	0	0.0	0	0
65 - 70	29.1	5	46	-478,015	0	0	14,870.7	0	0	0.0	0	0
70 - 75	31.1	3	25	-512,159	0	0	15,932.9	0	0	0.0	0	0
75 - 80	33.2	6	60	-546,303	0	0	16,995.1	10	638	0.0	0	0
80 - 85	35.3	4	37	-580,447	0	0	18,057.3	7	432	0.0	0	0
85 - 90	37.4	0	0	-614,591	0	0	19,119.5	0	0	0.0	0	0
90 - 95	39.4	2	15	-648,734	0	0	20,181.7	0	0	0.0	0	0
95 - 100	41.5	3	30	-682,878	0	0	21,243.9	0	0	0.0	0	0
Hours Off	0.0	0	7,780	0	0	6,995	0.0	0	2,602	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2
 WALL & ROOF INSULATION

----- B U I L D I N G T E M P E R A T U R E P R O F I L E S -----													
Temperature	----- Zone Number -----												
Range (F)	1	2	4	5	6	7	7	8	3	4	5	6	
Max. Temp.	83.1	79.3	87.6	86.3	85.0	86.6	108.9	110.0	169.5	115.2	114.2	110.0	
Mo./Hr.	7 19	7 23	7 21	7 21	7 20	7 20	8 20	8 21	9 19	7 20	7 20	8 19	
Day Type	4	1	4	4	4	4	1	1	2	2	2	1	
..... Number of Hours													
Above 100	0	0	0	0	0	0	1,977	2,044	3,420	2,610	2,381	2,100	
95 - 100	0	0	0	0	0	0	935	779	90	282	336	670	
90 - 95	0	0	0	0	0	0	16	121	684	334	359	174	
85 - 90	0	0	132	68	0	74	363	372	578	480	470	377	
80 - 85	871	0	1,593	1,292	822	1,093	466	458	519	378	177	419	
75 - 80	2,904	2,748	2,210	2,116	2,604	2,374	335	326	1,173	44	369	352	
70 - 75	1,035	1,368	399	628	670	559	203	370	1,329	815	529	256	
65 - 70	1,912	2,206	982	409	177	473	2,190	2,094	348	1,893	1,841	2,051	
60 - 65	926	1,333	339	983	1,163	987	965	997	338	783	980	1,050	
55 - 60	427	571	1,255	395	306	567	618	520	199	474	499	562	
50 - 55	328	365	708	1,421	1,433	1,281	692	679	82	667	819	749	
Below 50	357	169	1,142	1,448	1,585	1,352	0	0	0	0	0	0	
Min. Temp.	42.0	45.1	37.9	34.8	35.5	38.2	54.9	54.9	54.9	54.9	54.9	54.9	
Mo./Hr.	2 7	2 7	2 8	2 7	2 8	2 8	1 9	1 11	1 4	1 11	1 10	2 10	
Day Type	5	5	5	5	5	5	3	3	5	3	3	3	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2
WALL & ROOF INSULATION

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	HOT WTR	HOT W DMND
	Off Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	14,119	73	700	4
Feb	12,774	73	689	4
March	15,460	73	347	4
April	13,441	73	65	4
May	17,659	130	0	0
June	21,053	138	0	0
July	22,678	141	0	0
Aug	22,284	138	0	0
Sept	16,358	135	0	0
Oct	14,785	73	42	4
Nov	13,442	73	176	4
Dec	13,446	73	535	4
Total	197,497	141	2,554	4

Building Energy Consumption = 31,910 (Btu/Sq Ft/Year)
Source Energy Consumption = 81,121 (Btu/Sq Ft/Year)

Floor Area = 29,129 (Sq Ft)

----- EQUIPMENT ENERGY CONSUMPTION -----

Ref Num	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	13433	12154	14712	12793	14073	14073	12793	14712	12793	14073	12793	12793	161,198
	PK	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9
1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH2O	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1161													
	ELEC	0	0	0	0	1671	4323	6799	4733	1672	0	0	0	19,199
	PK	0.0	0.0	0.0	0.0	48.3	50.2	51.9	50.3	48.4	0.0	0.0	0.0	51.9
1	EQ5200													
	ELEC	0	0	0	0	157	386	658	428	167	0	0	0	1,795
	PK	0.0	0.0	0.0	0.0	2.3	3.7	4.7	4.0	3.1	0.0	0.0	0.0	4.7
1	EQ5303													
	ELEC	0	0	0	0	52	66	60	69	47	0	0	0	294
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
2	EQ1161													
	ELEC	0	0	0	0	41	460	746	514	141	0	0	0	1,902
	PK	0.0	0.0	0.0	0.0	4.9	5.5	5.6	5.5	5.3	0.0	0.0	0.0	5.6
2	EQ5200													
	ELEC	0	0	0	0	4	41	72	47	15	0	0	0	179
	PK	0.0	0.0	0.0	0.0	0.2	0.4	0.5	0.4	0.3	0.0	0.0	0.0	0.5
2	EQ5303													
	ELEC	0	0	0	0	52	66	60	69	47	0	0	0	294
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3

[illegible]

UTILITY PEAK CHECKSUMS - ALTERNATIVE 2
WALL & ROOF INSULATION

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 140.6 (kW)
Yearly Time of Peak 15 (hr) 7 (mo)

Hour 15 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Perct Of Tot (%)
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Cooling Equipment

1	EQ1161	AIR-CLD COND COMP <15 TONS	56.8	40.39
2	EQ1161	AIR-CLD COND COMP <15 TONS	6.4	4.58

Sub Total			63.2	44.97
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Sub Total			0.0	0.00
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Air Moving Equipment

1		SUMMATION OF FAN ELECTRICAL DEMAND	7.3	5.21
2		SUMMATION OF FAN ELECTRICAL DEMAND	0.1	0.09

Sub Total			7.4	5.29
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Sub Total			0.0	0.00
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Miscellaneous

Lights			69.9	49.74
Base Utilities			0.0	0.00
Misc Equipment			0.0	0.00
Sub Total			69.9	49.74

Grand Total			140.6	100.00
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 46

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Reflectance: 0.20
Winter Ground Reflectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 14:37:47 1/13/94
Dataset Name: CB46 .TM

AIRFLOW - ALTERNATIVE 3
REPLACE FLUORESCENT LAMPS

----- S Y S T E M S U M M A R Y -----
(Design Airflow Quantities)

System Number	System Type	----- Main -----					Auxil. Supply Airflow (Cfm)	Room Exhaust Airflow (Cfm)
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)		
1	SZ	1,788	16,245	16,345	20,272	5,715	0	0
2	PTAC	0	1,669	1,669	2,242	572	0	0
3	RAD	0	0	0	0	365	0	0
4	UH	0	0	6,035	0	2,238	0	0
Totals		1,788	17,914	24,050	22,514	8,890	0	0

CAPACITY - ALTERNATIVE 3
REPLACE FLUORESCENT LAMPS

----- S Y S T E M S U M M A R Y -----
(Design Capacity Quantities)

System Number	System Type	----- Cooling -----					----- Heating -----					
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	SZ	48.8	0.0	0.0	48.8	-664,375	0	-62,143	0	0	0	-664,375
2	PTAC	6.2	0.0	0.0	6.2	-85,172	0	0	0	0	0	-85,172
3	RAD	0.0	0.0	0.0	0.0	-49,312	0	0	0	0	0	-49,312
4	UH	0.0	0.0	0.0	0.0	-349,136	0	0	0	0	0	-349,136
Totals		55.0	0.0	0.0	55.0	-1,147,995	0	-62,143	0	0	0	-1,147,995

The building peaked at hour 16 month 7 with a capacity of 54.6 tons

ENGINEERING CHECKS - ALTERNATIVE 3
REPLACE FLUORESCENT LAMPS

----- E N G I N E E R I N G C H E C K S -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	----- Cooling -----				--- Heating ---		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	SZ	11.00	0.95	332.7	348.7	34.42	0.96	-39.02	17,026
2	Main	PTAC	0.00	1.20	271.0	225.1	53.30	1.20	-61.41	1,387
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-59.41	830
4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.61	-35.32	9,886

System 1 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Percnt		Space	Percnt		Space Peak	Coil Peak	Percnt
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	124,323		124,323	21.22	*	0	0.00	*	0	-90,278	16.49
Glass Solar	70,848	0		70,848	12.09	*	73,968	22.41	*	0	0	0.00
Glass Cond	19,448	0		19,448	3.32	*	19,852	6.02	*	-95,233	-95,233	17.40
Wall Cond	18,393	3,691		22,084	3.77	*	19,556	5.93	*	-67,914	-88,321	16.14
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	150,905			150,905	25.75	*	66,238	20.07	*	-273,498	-273,498	49.97
Sub Total==>	259,594	128,014		387,608	66.15	*	179,614	54.43	*	-436,645	-547,330	100.00
Internal Loads												
Lights	98,893	0		98,893	16.88	*	101,940	30.89	*	0	0	0.00
People	32,428			32,428	5.53	*	15,332	4.65	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	131,321	0	0	131,321	22.41	*	117,272	35.54	*	0	0	0.00
Ceiling Load	42,371	-42,371		0	0.00	*	33,113	10.03	*	-29,864	0	0.00
Outside Air	0	0	0	70,355	12.01	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				12,707	2.17	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		-16,041	0	-16,041	-2.74	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	433,286	69,602	0	585,950	100.00	*	329,998	100.00	*	-466,510	-547,330	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor	Part
Main Clg	48.8	586.0	443.4	16,245	83.8	66.8	73.9	55.6	54.9	64.9	17,026	0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0	0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	7,846	0
Totals	48.8	586.0									5,950	1,776

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	ENGINEERING CHECKS--			TEMPERATURES (F)---		
	(Mbh)	(cfm)	Deg F	Deg F				Clg % OA	11.0		Type	Clg	Htg
Main Htg	-664.4	16,345	56.9	94.2	Vent	1,788	0	Clg Cfm/Sqft	0.95		SADB	56.3	94.2
Aux Htg	0.0	0	0.0	0.0	Infil	3,927	3,927	Clg Cfm/Ton	332.69		Plenum	82.9	58.6
Preheat	-62.1	16,245	52.1	55.6	Supply	16,245	16,345	Clg Sqft/Ton	348.68		Return	83.0	58.0
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	34.42		Ret/OA	83.8	58.0
Humidif	0.0	0	0.0	0.0	Return	16,245	16,345	No. People	61		Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	1,788	0	Htg % OA	0.0		Fn MtrTD	0.2	0.2
Total	-664.4				Rm Exh	0	0	Htg Cfm/Sqft	0.96		Fn BldTD	0.1	0.1
					Auxil	0	0	Htg Btuh/Sqft	-39.02		Fn Frict	0.4	0.4

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/15 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	21,292		21,292	28.80	*	0	0.00	*	0	-17,685	20.76
Glass Solar	11,232	0		11,232	15.19	*	10,944	27.14	*	0	0	0.00
Glass Cond	3,009	0		3,009	4.07	*	3,180	7.89	*	-15,443	-15,443	18.13
Wall Cond	2,731	553		3,285	4.44	*	2,977	7.38	*	-9,254	-12,222	14.34
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	24,717			24,717	33.43	*	9,865	24.46	*	-39,853	-39,853	46.77
Sub Total==>	41,690	21,845		63,535	85.94	*	26,967	66.87	*	-64,550	-85,203	100.00
Internal Loads												
Lights	7,601	0		7,601	10.28	*	7,800	19.34	*	0	0	0.00
People	2,558			2,558	3.46	*	1,167	2.89	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	10,160	0	0	10,160	13.74	*	8,967	22.24	*	0	0	0.00
Ceiling Load	3,973	-3,973		0	0.00	*	4,392	10.89	*	-4,022	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				237	0.32	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	55,823	17,872	0	73,932	100.00	*	40,326	100.00	*	-68,572	-85,203	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor	1,387	
Main Clg	6.2	73.9	57.4	83.8 65.4 66.5	52.7 50.2 51.3	Part	0	
Aux Clg	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	0	
Opt Vent	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	Roof	1,387	0 0
Totals	6.2	73.9				Wall	867	288 33

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent	0	0	Clg Cfm/Sqft	1.20	SADB	52.8	105.7
Main Htg	-85.2	1,669	58.9	105.7	Infil	572	572	Clg Cfm/Ton	270.97	Plenum	84.0	58.9
Aux Htg	0.0	0	0.0	0.0	Supply	1,669	1,669	Clg Sqft/Ton	225.13	Return	83.8	58.9
Preheat	-0.0	1,669	58.9	52.7	Mincfm	0	0	Clg Btuh/Sqft	53.30	Ret/OA	83.8	58.9
Reheat	0.0	0	0.0	0.0	Return	1,669	1,669	No. People	5	Runarnd	75.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	1.20	Fn BldTD	0.0	0.0
Total	-85.2				Auxil	0	0	Htg Btuh/Sqft	-61.41	Fn Frict	0.1	0.0

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 3 Block RAD - RADIATION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Percent Of Tot (%)	*	Space Sensible (Btuh)	Percent Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Percent Of Tot (%)
Envelope Loads						*			*			
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	-6,714	13.61
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-10,295	-10,295	20.88
Wall Cond	0	0		0	0.00	*	0	0.00	*	-5,711	-6,907	14.01
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-25,396	-25,396	51.50
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-41,403	-49,312	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	-7,805	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-49,208	-49,312	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total	Glass (sf)	(%)
Main Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Floor	830	
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Part	0	
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	0	
Totals	0.0	0.0				Roof	830	0 0
						Wall	553	192 35

-----AREAS-----

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
Main Htg	-49.3	0	0.0	0.0	Vent	0	0	Clg Cfm/Sqft	0.00	SAOB	0.0	68.1
Aux Htg	0.0	0	0.0	0.0	Infil	0	365	Clg Cfm/Ton	0.00	Plenum	0.0	38.8
Preheat	0.0	0	0.0	0.0	Supply	0	0	Clg Sqft/Ton	0.00	Return	0.0	39.0
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	39.0
Humidif	0.0	0	0.0	0.0	Return	0	0	No. People	0	Runarnd	0.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-49.3				Rm Exh	0	0	Htg Cfm/Sqft	0.00	Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/Sqft	-59.41	Fn Frict	0.0	0.0

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 4 Block UH - UNIT HEATERS

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	-74,057	21.67
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-73,355	-73,355	21.47
Wall Cond	0	0		0	0.00	*	0	0.00	*	-30,899	-38,407	11.24
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-155,894	-155,894	45.62
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-260,148	-341,713	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	-84,880	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-345,028	-341,713	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Part	9,886	
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	0	
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Roof	8,985	0 0
Totals	0.0	0.0				Wall	3,392	1,368 40

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent			Clg Cfm/Sqft	0.00	SADB	0.0	120.5
Main Htg	-349.1	6,035	67.4	120.5	Infil	0	2,238	Clg Cfm/Ton	0.00	Plenum	0.0	39.6
Aux Htg	0.0	0	0.0	0.0	Supply	0	6,035	Clg Sqft/Ton	0.00	Return	0.0	68.0
Preheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	68.0
Reheat	0.0	0	0.0	0.0	Return	0	6,035	No. People	0	Runarnd	0.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	0.61	Fn BldTD	0.0	0.0
Total	-349.1				Auxil	0	0	Htg Btuh/Sqft	-35.32	Fn Frict	0.0	0.1

BUILDING U-VALUES - ALTERNATIVE 3
REPLACE FLUORESCENT LAMPS

----- B U I L D I N G U - V A L U E S -----												
Room Number	Description	Part.	ExFlr	Room U-Values (Btu/hr/sqft/F)							Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
				Summr Skylt	Wintr Skylt	Roof	Summr Windo	Wintr Windo	Wall	Ceil.		
1	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	45.0	9.63
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	45.0	9.63
2	LIQUOR STORE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.343	0.317	100.3	21.77
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.343	0.317	100.3	21.77
4	LIBRARY	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
5	GAME ROOM	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	49.2	10.88
6	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
7	2ND FL OFFICE	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	75.9	17.16
7	2ND FL OFFICE	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
8	2ND FL TOILETS	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	62.6	14.24
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	62.6	14.24
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	78.1	17.65
3	LIQUOR STORAGE	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	29.8	6.29
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	29.8	6.29
4	LIBRARY	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
5	GAME ROOM	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
6	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
System	4 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	47.0	10.75
Building		0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	50.5	11.33

BUILDING AREAS - ALTERNATIVE 3
REPLACE FLUORESCENT LAMPS

----- B U I L D I N G A R E A S -----													
Room Number	Description	Number of Duplicate Flr	Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	1ST FL OFFICES	1	1	8,053	8,053	0	0	0	0	0	624	24	1,926
Zone	1 Total/Ave.				8,053	0	0	0	0	0	624	24	1,926
2	LIQUOR STORE	1	1	1,127	1,127	0	0	0	0	0	0	0	739
Zone	2 Total/Ave.				1,127	0	0	0	0	0	0	0	739
4	LIBRARY	1	1	3,692	3,692	0	0	0	0	3,692	576	44	733
Zone	4 Total/Ave.				3,692	0	0	0	0	3,692	576	44	733
5	GAME ROOM	1	1	4,154	4,154	0	0	0	0	4,154	576	43	775
Zone	5 Total/Ave.				4,154	0	0	0	0	4,154	576	43	775
System	1 Total/Ave.				17,026	0	0	0	0	7,846	1,776	30	4,174
6	2ND FL OFFICES	1	1	1,139	1,139	0	0	0	0	1,139	192	32	403
Zone	6 Total/Ave.				1,139	0	0	0	0	1,139	192	32	403
7	2ND FL OFFICE	1	1	248	248	0	0	0	0	248	96	35	176
Zone	7 Total/Ave.				248	0	0	0	0	248	96	35	176
System	2 Total/Ave.				1,387	0	0	0	0	1,387	288	33	579
7	2ND FL OFFICE	1	1	248	248	0	0	0	0	248	96	35	176
Zone	7 Total/Ave.				248	0	0	0	0	248	96	35	176
8	2ND FL TOILETS	1	1	582	582	0	0	0	0	582	96	34	184
Zone	8 Total/Ave.				582	0	0	0	0	582	96	34	184
System	3 Total/Ave.				830	0	0	0	0	830	192	35	360
3	LIQUOR STORAGE	1	1	901	901	0	0	0	0	0	24	18	112
Zone	3 Total/Ave.				901	0	0	0	0	0	24	18	112
4	LIBRARY	1	1	3,692	3,692	0	0	0	0	3,692	576	44	733
Zone	4 Total/Ave.				3,692	0	0	0	0	3,692	576	44	733
5	GAME ROOM	1	1	4,154	4,154	0	0	0	0	4,154	576	43	775
Zone	5 Total/Ave.				4,154	0	0	0	0	4,154	576	43	775
6	2ND FL OFFICES	1	1	1,139	1,139	0	0	0	0	1,139	192	32	403
Zone	6 Total/Ave.				1,139	0	0	0	0	1,139	192	32	403
System	4 Total/Ave.				9,886	0	0	0	0	8,985	1,368	40	2,023
Building					29,129	0	0	0	0	19,048	3,624	34	7,137

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By: Trane Customer Direct Service Network

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ASHRAE 90 ANALYSIS - ALTERNATIVE 3
REPLACE FLUORESCENT LAMPS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.232 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.500 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.329 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 18.58 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTVw) = 33.33 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 3
REPLACE FLUORESCENT LAMPS

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	2.7	5	39	-60,507	24	558	1,202.5	0	0	0.0	0	0
5 - 10	5.5	11	89	-121,014	29	672	2,405.0	0	0	0.0	0	0
10 - 15	8.2	0	0	-181,521	19	442	3,607.4	0	0	0.0	0	0
15 - 20	11.0	7	53	-242,027	3	68	4,809.9	0	0	0.0	0	0
20 - 25	13.7	5	42	-302,534	1	24	6,012.4	0	0	0.0	0	0
25 - 30	16.5	11	86	-363,041	2	35	7,214.9	59	3,638	0.0	0	0
30 - 35	19.2	2	18	-423,548	1	23	8,417.4	0	0	0.0	0	0
35 - 40	22.0	7	58	-484,055	0	7	9,619.8	0	0	0.0	0	0
40 - 45	24.7	9	71	-544,562	2	42	10,822.3	0	0	0.0	0	0
45 - 50	27.5	6	51	-605,069	2	42	12,024.8	0	0	0.0	0	0
50 - 55	30.2	5	43	-665,576	10	229	13,227.3	0	0	0.0	0	0
55 - 60	33.0	11	90	-726,083	7	162	14,429.8	24	1,450	0.0	0	0
60 - 65	35.7	2	19	-786,589	0	0	15,632.2	0	0	0.0	0	0
65 - 70	38.5	5	38	-847,096	0	0	16,834.7	0	0	0.0	0	0
70 - 75	41.2	8	65	-907,603	0	0	18,037.2	17	1,070	0.0	0	0
75 - 80	44.0	2	15	-968,110	0	0	19,239.7	0	0	0.0	0	0
80 - 85	46.7	1	5	-1,028,617	0	0	20,442.2	0	0	0.0	0	0
85 - 90	49.5	2	20	-1,089,124	0	0	21,644.6	0	0	0.0	0	0
90 - 95	52.2	0	0	-1,149,631	0	0	22,847.1	0	0	0.0	0	0
95 - 100	55.0	0	0	-1,210,138	0	0	24,049.6	0	0	0.0	0	0
Hours Off	0.0	0	7,958	0	0	6,456	0.0	0	2,602	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 3
REPLACE FLUORESCENT LAMPS

----- B U I L D I N G T E M P E R A T U R E P R O F I L E S -----													
Temperature	----- Zone Number -----												
Range (F)	1	2	4	5	6	7	7	8	3	4	5	6	
Max. Temp.	83.5	81.1	89.9	88.9	87.3	87.5	104.0	103.9	127.7	108.8	107.8	104.1	
Mo./Hr.	7 20	7 21	7 20	7 20	7 20	7 20	8 20	7 20	8 18	7 21	7 19	7 19	
Day Type	4	4	4	4	4	4	1	2	2	1	2	2	
..... Number of Hours													
Above 100	0	0	0	0	0	0	543	558	2,928	1,241	1,005	549	
95 - 100	0	0	0	0	0	0	1,348	958	226	924	757	1,006	
90 - 95	0	0	0	0	0	0	824	1,008	305	657	804	991	
85 - 90	0	0	218	154	110	132	475	474	645	649	556	452	
80 - 85	820	274	1,443	1,305	993	1,070	482	674	48	201	480	674	
75 - 80	2,451	2,477	1,788	1,848	2,194	2,255	34	0	746	51	70	0	
70 - 75	773	938	482	399	409	317	353	238	1,088	661	388	84	
65 - 70	2,053	2,157	590	604	386	427	1,917	2,007	1,531	1,750	1,735	2,015	
60 - 65	1,019	1,325	759	544	779	1,060	1,061	1,051	489	924	987	1,102	
55 - 60	631	730	635	716	664	499	743	782	282	718	799	779	
50 - 55	377	336	823	655	660	885	980	1,010	472	984	1,179	1,108	
Below 50	636	523	2,022	2,535	2,565	2,115	0	0	0	0	0	0	
Min. Temp.	37.0	39.0	34.5	32.1	33.2	36.2	54.9	54.9	54.9	54.9	54.9	54.9	
Mo./Hr.	2 7	2 7	2 10	2 8	2 8	2 9	1 5	1 6	1 1	1 6	1 4	1 5	
Day Type	5	5	4	5	5	4	3	2	4	2	3	2	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 3
REPLACE FLUORESCENT LAMPS

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	HOT WTR	HOT W DMND
	Off Peak (kWh)	On Peak (kW)	On Peak (Thrm)	On Peak (Thrm/hr)
Jan	12,515	65	1,276	7
Feb	11,323	65	1,217	7
March	13,700	65	681	7
April	11,909	65	143	7
May	15,523	144	0	0
June	19,806	149	0	0
July	22,550	152	0	0
Aug	20,755	149	0	0
Sept	14,080	145	0	0
Oct	13,099	65	109	7
Nov	11,912	65	458	7
Dec	11,919	65	1,031	7
Total	179,092	152	4,915	7

Building Energy Consumption = 37,859 (Btu/Sq Ft/Year)
Source Energy Consumption = 85,458 (Btu/Sq Ft/Year)

Floor Area = 29,129 (Sq Ft)

----- EQUIPMENT ENERGY CONSUMPTION -----

Ref Num	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	11754	10635	12873	11194	12314	12314	11194	12873	11194	12314	11194	11194	141,048
	PK	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2
1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH2O	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1161	AIR-CLD COND COMP <15 TONS												
	ELEC	0	0	0	0	1209	4630	7873	4858	1063	0	0	0	19,633
	PK	0.0	0.0	0.0	0.0	62.9	65.4	67.6	65.6	63.2	0.0	0.0	0.0	67.6
1	EQ5200	CONDENSER FANS												
	ELEC	0	0	0	0	126	426	763	454	112	0	0	0	1,880
	PK	0.0	0.0	0.0	0.0	3.3	5.1	6.0	5.0	3.7	0.0	0.0	0.0	6.0
1	EQ5303	CONTROLS												
	ELEC	0	0	0	0	24	66	60	69	22	0	0	0	241
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
2	EQ1161	AIR-CLD COND COMP <15 TONS												
	ELEC	0	0	0	0	98	545	950	589	95	0	0	0	2,277
	PK	0.0	0.0	0.0	0.0	7.9	8.3	8.5	8.3	8.0	0.0	0.0	0.0	8.5
2	EQ5200	CONDENSER FANS												
	ELEC	0	0	0	0	10	51	92	56	10	0	0	0	219
	PK	0.0	0.0	0.0	0.0	0.3	0.6	0.8	0.6	0.5	0.0	0.0	0.0	0.8
2	EQ5303	CONTROLS												

[illegible]

UTILITY PEAK CHECKSUMS - ALTERNATIVE 3
REPLACE FLUORESCENT LAMPS

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 152.5 (kW)
Yearly Time of Peak 15 (hr) 7 (mo)

Hour 15 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Perct Of Tot (%)
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Cooling Equipment

1	EQ1161	AIR-CLD COND COMP <15 TONS	73.9	48.49
2	EQ1161	AIR-CLD COND COMP <15 TONS	9.6	6.29

Sub Total			83.5	54.77
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Sub Total			0.0	0.00
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Air Moving Equipment

1		SUMMATION OF FAN ELECTRICAL DEMAND	7.6	5.02
2		SUMMATION OF FAN ELECTRICAL DEMAND	0.1	0.09

Sub Total			7.8	5.11
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Sub Total			0.0	0.00
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Miscellaneous

Lights			61.2	40.12
Base Utilities			0.0	0.00
Misc Equipment			0.0	0.00
Sub Total			61.2	40.12

Grand Total			152.5	100.00
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**                                     **
**          T R A C E   6 0 0   A N A L Y S I S          **
**                                     **
**          by                **
**                                     **
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 46

Weather File Code:	CARLISLE
Location:	ENERGY SAVINGS OPPORTUNITY STUDY
Latitude:	40.2 (deg)
Longitude:	77.2 (deg)
Time Zone:	5
Elevation:	475 (ft)
Barometric Pressure:	29.2 (in. Hg)
Summer Clearness Number:	1.00
Winter Clearness Number:	1.00
Summer Design Dry Bulb:	92 (F)
Summer Design Wet Bulb:	72 (F)
Winter Design Dry Bulb:	4 (F)
Summer Ground Reflectance:	0.20
Winter Ground Reflectance:	0.20
Air Density:	0.0742 (Lbm/cuft)
Air Specific Heat:	0.2444 (Btu/lbm/F)
Density-Specific Heat Prod:	1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor:	4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor:	4.4519 (Lb-min./hr/cuft)
Design Simulation Period:	May To September
System Simulation Period:	January To December
Cooling Load Methodology:	CLTD/CLF (Transfer Function Method)
Time/Date Program was Run:	15: 9:10 1/13/94
Dataset Name:	CB46 .TM

AIRFLOW - ALTERNATIVE 4
REPLACE FLUORESCENT BALLASTS

----- S Y S T E M S U M M A R Y -----

(Design Airflow Quantities)

System Number	System Type	Main					Auxil. Supply Airflow (Cfm)	Room Exhaust Airflow (Cfm)
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)		
1	SZ	1,731	15,864	15,964	19,891	5,658	0	0
2	PTAC	0	1,608	1,608	2,180	572	0	0
3	RAD	0	0	0	0	365	0	0
4	UH	0	0	6,035	0	2,238	0	0
Totals		1,731	17,472	23,607	22,071	8,833	0	0

CAPACITY - ALTERNATIVE 4
REPLACE FLUORESCENT BALLASTS

----- S Y S T E M S U M M A R Y -----

(Design Capacity Quantities)

		Cooling				Heating						
		Main Sys.	Aux. Sys.	Opt. Vent	Cooling	Main Sys.	Aux. Sys.	Preheat	Reheat	Humidif.	Opt. Vent	Heating
System	System	Capacity	Capacity	Capacity	Totals	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity	Totals
Number	Type	(Tons)	(Tons)	(Tons)	(Tons)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)
1	SZ	47.2	0.0	0.0	47.2	-662,886	0	-67,477	0	0	0	-662,886
2	PTAC	6.1	0.0	0.0	6.1	-84,944	0	0	0	0	0	-84,944
3	RAD	0.0	0.0	0.0	0.0	-49,312	0	0	0	0	0	-49,312
4	UH	0.0	0.0	0.0	0.0	-349,136	0	0	0	0	0	-349,136
Totals		53.2	0.0	0.0	53.2	-1,146,277	0	-67,477	0	0	0	-1,146,277

The building peaked at hour 16 month 7 with a capacity of 52.9 tons

ENGINEERING CHECKS - ALTERNATIVE 4
REPLACE FLUORESCENT BALLASTS

----- E N G I N E E R I N G C H E C K S -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	Cooling				Heating		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	SZ	10.91	0.93	336.3	360.9	33.25	0.94	-38.93	17,026
2	Main	PTAC	0.00	1.16	265.2	228.8	52.45	1.16	-61.24	1,387
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-59.41	830
4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.61	-35.32	9,886

System 1 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	124,323		124,323	21.96	*	0	0.00	*	0	-90,278	16.49
Glass Solar	70,848	0		70,848	12.51	*	73,968	23.36	*	0	0	0.00
Glass Cond	19,448	0		19,448	3.44	*	19,852	6.27	*	-95,233	-95,233	17.40
Wall Cond	18,393	3,672		22,064	3.90	*	19,556	6.17	*	-67,914	-88,307	16.13
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	148,637			148,637	26.25	*	66,238	20.91	*	-273,498	-273,498	49.97
Sub Total==>	257,325	127,995		385,320	68.06	*	179,614	56.71	*	-436,645	-547,316	100.00
Internal Loads												
Lights	84,765	0		84,765	14.97	*	87,377	27.59	*	0	0	0.00
People	32,428			32,428	5.73	*	15,332	4.84	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	117,194	0	0	117,194	20.70	*	102,709	32.43	*	0	0	0.00
Ceiling Load	42,679	-42,679		0	0.00	*	34,387	10.86	*	-30,360	0	0.00
Outside Air	0	0	0	66,988	11.83	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				12,410	2.19	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	-0.00	*	0	-0.00	*	0	0	0.00
Exhaust Heat		-15,769	0	-15,769	-2.79	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	417,198	69,547	0	566,142	100.00	*	316,709	100.00	*	-467,005	-547,316	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			AREAS-----		
	(Tons)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Gross Total	Glass (sf)	(%)
Main Clg	47.2	566.1	428.3	15,864	83.8	67.0	74.8	55.9	55.3	65.8	Floor	17,026
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0
Totals	47.2	566.1									Roof	7,846
											Wall	5,950
												1,776
												30

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	--ENGINEERING CHECKS--		--TEMPERATURES (F)---		
	(Mbh)	(cfm)	Deg F	Deg F				Clg % OA	10.9	Type	Clg	Htg
Main Htg	-662.9	15,964	56.7	94.9	Vent	1,731	0	Clg Cfm/Sqft	0.93	SADB	56.7	94.9
Aux Htg	0.0	0	0.0	0.0	Infil	3,927	3,927	Clg Cfm/Ton	336.26	Plenum	82.9	58.6
Preheat	-67.5	15,864	52.0	55.9	Supply	15,864	15,964	Clg Sqft/Ton	360.88	Return	83.0	57.9
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	33.25	Ret/OA	83.8	57.9
Humidif	0.0	0	0.0	0.0	Return	15,864	15,964	No. People	61	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	1,731	0	Htg % OA	0.0	Fn MtrTD	0.2	0.2
Total	-662.9				Rm Exh	0	0	Htg Cfm/Sqft	0.94	Fn BldTD	0.1	0.1
					Auxil	0	0	Htg Btuh/Sqft	-38.93	Fn Frict	0.4	0.4

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/15 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	21,218		21,218	29.16	*	0	0.00	*	0	-17,622	20.70
Glass Solar	11,232	0		11,232	15.44	*	10,944	27.83	*	0	0	0.00
Glass Cond	3,009	0		3,009	4.14	*	3,180	8.09	*	-15,443	-15,443	18.14
Wall Cond	2,731	542		3,274	4.50	*	2,977	7.57	*	-9,254	-12,213	14.35
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	24,717			24,717	33.97	*	9,865	25.09	*	-39,853	-39,853	46.81
Sub Total==>	41,690	21,760		63,450	87.21	*	26,967	68.57	*	-64,550	-85,131	100.00
Internal Loads						*			*			
Lights	6,515	0		6,515	8.96	*	6,686	17.00	*	0	0	0.00
People	2,558			2,558	3.52	*	1,167	2.97	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	9,074	0	0	9,074	12.47	*	7,853	19.97	*	0	0	0.00
Ceiling Load	4,073	-4,073		0	0.00	*	4,507	11.46	*	-4,128	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				229	0.31	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	54,837	17,687	0	72,753	100.00	*	39,327	100.00	*	-68,678	-85,131	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor		
Main Clg	6.1	72.8	56.3	84.0	65.4	66.5	52.4	49.9	50.7	Part	0	
Aux Clg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0	
Opt Vent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	1,387	0 0
Totals	6.1	72.8								Wall	867	288 33

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	--ENGINEERING CHECKS--		--TEMPERATURES (F)---		
	(Mbh)	(cfm)	Deg F	Deg F	Vent			Clg % OA	0.0	Type	Clg	Htg
Main Htg	-84.9	1,608	58.7	107.3	Infil	572	572	Clg Cfm/Sqft	1.16	SADB	52.5	107.3
Aux Htg	0.0	0	0.0	0.0	Supply	1,608	1,608	Clg Cfm/Ton	265.16	Plenum	84.3	58.7
Preheat	-0.0	1,608	58.7	52.4	Mincfm	0	0	Clg Sqft/Ton	228.77	Return	83.9	58.7
Reheat	0.0	0	0.0	0.0	Return	1,608	1,608	Clg Btuh/Sqft	52.45	Ret/OA	83.9	58.7
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	No. People	5	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-84.9				Auxil	0	0	Htg Cfm/Sqft	1.16	Fn BldTD	0.0	0.0
								Htg Btuh/Sqft	-61.24	Fn Frict	0.1	0.0

System 3 Block RAD - RADIATION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads						*			*			
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	-6,714	13.61
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-10,295	-10,295	20.88
Wall Cond	0	0		0	0.00	*	0	0.00	*	-5,711	-6,907	14.01
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-25,396	-25,396	51.50
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-41,403	-49,312	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	-7,805	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-49,208	-49,312	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total Floor	Glass (sf)	(%)
Main Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Part	830	
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	0	
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Roof	830	0 0
Totals	0.0	0.0				Wall	553	192 35

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
Main Htg	-49.3	0	0.0	0.0	Vent	0	0	Clg Cfm/Sqft	0.00	SADB	0.0	68.1
Aux Htg	0.0	0	0.0	0.0	Infil	0	365	Clg Cfm/Ton	0.00	Plenum	0.0	38.8
Preheat	0.0	0	0.0	0.0	Supply	0	0	Clg Sqft/Ton	0.00	Return	0.0	39.0
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	39.0
Humidif	0.0	0	0.0	0.0	Return	0	0	No. People	0	Runarnd	0.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-49.3				Rm Exh	0	0	Htg Cfm/SqFt	0.00	Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/SqFt	-59.41	Fn Frict	0.0	0.0

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 4 Block UH - UNIT HEATERS

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	-74,057	21.67
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-73,355	-73,355	21.47
Wall Cond	0	0		0	0.00	*	0	0.00	*	-30,899	-38,407	11.24
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-155,894	-155,894	45.62
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-260,148	-341,713	100.00
Internal Loads												
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	-84,880	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-345,028	-341,713	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Part	0	
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	0	
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Roof	8,985	0 0
Totals	0.0	0.0				Wall	3,392	1,368 40

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent			Clg Cfm/Sqft	0.00	SADB	0.0	120.5
Main Htg	-349.1	6,035	67.4	120.5	Infil	0	2,238	Clg Cfm/Ton	0.00	Plenum	0.0	39.6
Aux Htg	0.0	0	0.0	0.0	Supply	0	6,035	Clg Sqft/Ton	0.00	Return	0.0	68.0
Preheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	68.0
Reheat	0.0	0	0.0	0.0	Return	0	6,035	No. People	0	Runarnd	0.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	0.61	Fn BldTD	0.0	0.0
Total	-349.1				Auxil	0	0	Htg Btuh/Sqft	-35.32	Fn Frict	0.0	0.1

-----AIRFLOWS (cfm)-----

--ENGINEERING CHECKS--

--TEMPERATURES (F)---

BUILDING U-VALUES - ALTERNATIVE 4
REPLACE FLUORESCENT BALLASTS

----- B U I L D I N G U - V A L U E S -----

Room Number	Description	Part.	ExFlr	Room U-Values (Btu/hr/sqft/F)							Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
				Summr Skylt	Wintr Skylt	Roof	Summr Windo	Wintr Windo	Wall	Ceil.		
1	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	45.0	9.63
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	45.0	9.63
2	LIQUOR STORE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.343	0.317	100.3	21.77
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.343	0.317	100.3	21.77
4	LIBRARY	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
5	GAME ROOM	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	49.2	10.88
6	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
7	2ND FL OFFICE	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	75.9	17.16
7	2ND FL OFFICE	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
8	2ND FL TOILETS	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	62.6	14.24
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	62.6	14.24
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	78.1	17.65
3	LIQUOR STORAGE	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	29.8	6.29
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	29.8	6.29
4	LIBRARY	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
5	GAME ROOM	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
6	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
System	4 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	47.0	10.75
Building		0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	50.5	11.33

BUILDING AREAS - ALTERNATIVE 4
REPLACE FLUORESCENT BALLASTS

----- B U I L D I N G A R E A S -----													
Room Number	Description	Number of Duplicate Flr	Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Sk1 /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /W1 (%)	Net Wall Area (sqft)
1	1ST FL OFFICES	1	1	8,053	8,053	0	0	0	0	0	624	24	1,926
Zone	1 Total/Ave.				8,053	0	0	0	0	0	624	24	1,926
2	LIQUOR STORE	1	1	1,127	1,127	0	0	0	0	0	0	0	739
Zone	2 Total/Ave.				1,127	0	0	0	0	0	0	0	739
4	LIBRARY	1	1	3,692	3,692	0	0	0	0	3,692	576	44	733
Zone	4 Total/Ave.				3,692	0	0	0	0	3,692	576	44	733
5	GAME ROOM	1	1	4,154	4,154	0	0	0	0	4,154	576	43	775
Zone	5 Total/Ave.				4,154	0	0	0	0	4,154	576	43	775
System	1 Total/Ave.				17,026	0	0	0	0	7,846	1,776	30	4,174
6	2ND FL OFFICES	1	1	1,139	1,139	0	0	0	0	1,139	192	32	403
Zone	6 Total/Ave.				1,139	0	0	0	0	1,139	192	32	403
7	2ND FL OFFICE	1	1	248	248	0	0	0	0	248	96	35	176
Zone	7 Total/Ave.				248	0	0	0	0	248	96	35	176
System	2 Total/Ave.				1,387	0	0	0	0	1,387	288	33	579
7	2ND FL OFFICE	1	1	248	248	0	0	0	0	248	96	35	176
Zone	7 Total/Ave.				248	0	0	0	0	248	96	35	176
8	2ND FL TOILETS	1	1	582	582	0	0	0	0	582	96	34	184
Zone	8 Total/Ave.				582	0	0	0	0	582	96	34	184
System	3 Total/Ave.				830	0	0	0	0	830	192	35	360
3	LIQUOR STORAGE	1	1	901	901	0	0	0	0	0	24	18	112
Zone	3 Total/Ave.				901	0	0	0	0	0	24	18	112
4	LIBRARY	1	1	3,692	3,692	0	0	0	0	3,692	576	44	733
Zone	4 Total/Ave.				3,692	0	0	0	0	3,692	576	44	733
5	GAME ROOM	1	1	4,154	4,154	0	0	0	0	4,154	576	43	775
Zone	5 Total/Ave.				4,154	0	0	0	0	4,154	576	43	775
6	2ND FL OFFICES	1	1	1,139	1,139	0	0	0	0	1,139	192	32	403
Zone	6 Total/Ave.				1,139	0	0	0	0	1,139	192	32	403
System	4 Total/Ave.				9,886	0	0	0	0	8,985	1,368	40	2,023
Building					29,129	0	0	0	0	19,048	3,624	34	7,137

ASHRAE 90 ANALYSIS - ALTERNATIVE 4
REPLACE FLUORESCENT BALLASTS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.232 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.500 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.329 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 18.58 (Btu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTVw) = 33.33 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 4
REPLACE FLUORESCENT BALLASTS

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	2.7	8	64	-60,688	26	621	1,180.4	0	0	0.0	0	0
5 - 10	5.3	7	52	-121,375	28	662	2,360.7	0	0	0.0	0	0
10 - 15	8.0	1	4	-182,063	18	439	3,541.1	0	0	0.0	0	0
15 - 20	10.6	10	79	-242,751	2	52	4,721.5	0	0	0.0	0	0
20 - 25	13.3	7	53	-303,439	2	56	5,901.8	0	0	0.0	0	0
25 - 30	16.0	5	41	-364,126	2	48	7,082.2	59	3,638	0.0	0	0
30 - 35	18.6	7	56	-424,814	1	13	8,262.6	0	0	0.0	0	0
35 - 40	21.3	9	68	-485,502	1	24	9,442.9	0	0	0.0	0	0
40 - 45	24.0	4	32	-546,190	0	0	10,623.3	0	0	0.0	0	0
45 - 50	26.6	11	85	-606,878	2	49	11,803.7	0	0	0.0	0	0
50 - 55	29.3	3	22	-667,565	11	264	12,984.0	0	0	0.0	0	0
55 - 60	31.9	11	87	-728,253	7	162	14,164.4	24	1,450	0.0	0	0
60 - 65	34.6	0	0	-788,941	0	0	15,344.8	0	0	0.0	0	0
65 - 70	37.3	5	38	-849,629	0	0	16,525.1	0	0	0.0	0	0
70 - 75	39.9	8	65	-910,316	0	0	17,705.5	17	1,070	0.0	0	0
75 - 80	42.6	2	15	-971,004	0	0	18,885.9	0	0	0.0	0	0
80 - 85	45.3	1	5	-1,031,692	0	0	20,066.2	0	0	0.0	0	0
85 - 90	47.9	3	20	-1,092,379	0	0	21,246.6	0	0	0.0	0	0
90 - 95	50.6	0	0	-1,153,067	0	0	22,427.0	0	0	0.0	0	0
95 - 100	53.2	0	0	-1,213,755	0	0	23,607.3	0	0	0.0	0	0
Hours Off	0.0	0	7,974	0	0	6,370	0.0	0	2,602	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 4
REPLACE FLUORESCENT BALLASTS

----- B U I L D I N G T E M P E R A T U R E P R O F I L E S -----													
Temperature	----- Zone Number -----												
Range (F)	1	2	4	5	6	7	7	8	3	4	5	6	
Max. Temp.	83.5	81.1	89.9	88.9	87.3	87.5	103.5	102.9	123.1	107.7	106.6	103.1	
Mo./Hr.	7 20	7 22	7 20	7 20	7 20	7 20	8 20	7 20	8 18	7 21	7 20	7 19	
Day Type	4	4	4	4	4	4	1	2	2	1	1	2	
	..... Number of Hours												
Above 100	0	0	0	0	0	0	451	297	2,912	1,045	824	293	
95 - 100	0	0	0	0	0	0	1,278	1,075	44	1,004	870	1,116	
90 - 95	0	0	0	0	0	0	946	1,111	337	681	650	1,044	
85 - 90	0	0	203	154	110	132	470	460	807	613	664	466	
80 - 85	696	257	1,430	1,251	975	1,061	527	729	40	329	576	753	
75 - 80	2,561	2,375	1,812	1,858	2,212	2,228	17	0	495	34	88	0	
70 - 75	635	1,040	465	426	392	336	288	117	1,017	566	285	84	
65 - 70	2,074	2,165	553	575	399	444	1,976	2,032	1,781	1,797	1,793	1,986	
60 - 65	1,116	1,327	779	545	738	1,034	1,044	1,139	547	967	991	1,098	
55 - 60	658	734	624	672	706	493	779	769	282	740	836	812	
50 - 55	376	335	758	655	625	896	984	1,031	498	984	1,183	1,108	
Below 50	644	527	2,136	2,624	2,603	2,136	0	0	0	0	0	0	
Min. Temp.	36.9	39.0	34.4	32.0	33.0	36.1	54.9	54.9	54.9	54.9	54.9	54.9	
Mo./Hr.	2 7	2 7	2 10	2 10	2 8	2 10	1 5	1 6	1 24	1 6	1 4	1 5	
Day Type	5	5	4	4	5	4	2	2	3	2	2	2	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 4
REPLACE FLUORESCENT BALLASTS

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	HOT WTR	HOT W DMND
	Off Peak (kWh)	On Peak (kW)	On Peak (Therm)	Qn Peak (Thrm/hr)
Jan	10,798	56	1,305	7
Feb	9,770	56	1,244	7
March	11,821	56	719	7
April	10,274	56	171	7
May	13,434	131	0	0
June	17,572	137	0	0
July	20,463	141	0	0
Aug	18,401	138	0	0
Sept	12,169	133	0	0
Oct	11,301	56	122	7
Nov	10,277	56	484	7
Dec	10,284	56	1,061	7
Total	156,565	141	5,105	7

Building Energy Consumption = 35,871 (8tu/Sq Ft/Year)
Source Energy Consumption = 78,407 (8tu/Sq Ft/Year)

Floor Area = 29,129 (Sq Ft)

----- EQUIPMENT ENERGY CONSUMPTION -----

Ref Num	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	10075	9115	11034	9595	10555	10555	9595	11034	9595	10555	9595	9595	120,898
	PK	52.4	52.4	52.4	52.4	52.4	52.4	52.4	52.4	52.4	52.4	52.4	52.4	52.4
1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH2O	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1161		AIR-CLD COND COMP <15 TONS											
	ELEC	0	0	0	0	972	4258	7488	4454	838	0	0	0	18,010
	PK	0.0	0.0	0.0	0.0	60.8	63.2	65.4	63.4	61.0	0.0	0.0	0.0	65.4
1	EQ5200		CONDENSER FANS											
	ELEC	0	0	0	0	102	393	725	419	88	0	0	0	1,728
	PK	0.0	0.0	0.0	0.0	2.4	4.8	5.8	4.8	3.5	0.0	0.0	0.0	5.8
1	EQ5303		CONTROLS											
	ELEC	0	0	0	0	19	66	60	69	17	0	0	0	230
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
2	EQ1161		AIR-CLD COND COMP <15 TONS											
	ELEC	0	0	0	0	77	517	923	559	76	0	0	0	2,152
	PK	0.0	0.0	0.0	0.0	7.8	8.1	8.4	8.1	7.8	0.0	0.0	0.0	8.4
2	EQ5200		CONDENSER FANS											
	ELEC	0	0	0	0	8	49	90	53	8	0	0	0	208
	PK	0.0	0.0	0.0	0.0	0.2	0.6	0.7	0.6	0.5	0.0	0.0	0.0	0.7
2	EQ5303		CONTROLS											

[illegible]

UTILITY PEAK CHECKSUMS - ALTERNATIVE 4
REPLACE FLUORESCENT BALLASTS

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 140.9 (kW)
Yearly Time of Peak 15 (hr) 7 (mo)

Hour 15 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Perct Of Tot (%)
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Cooling Equipment

1	EQ1161	AIR-CLD COND COMP <15 TONS	71.4	50.70
2	EQ1161	AIR-CLD COND COMP <15 TONS	9.4	6.70

Sub Total			80.9	57.39
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Sub Total			0.0	0.00
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Air Moving Equipment

1		SUMMATION OF FAN ELECTRICAL DEMAND	7.5	5.30
2		SUMMATION OF FAN ELECTRICAL DEMAND	0.1	0.10

Sub Total			7.6	5.40
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Sub Total			0.0	0.00
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Miscellaneous

Lights			52.4	37.21
Base Utilities			0.0	0.00
Misc Equipment			0.0	0.00
Sub Total			52.4	37.21

Grand Total			140.9	100.00
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ENERGY SAVINGS OPPORTUNITY STUDY

CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 46

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Relectance: 0.20
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 7:33:34 1/14/94
Dataset Name: CB46B .TM

AIRFLOW - ALTERNATIVE 1
REPLACE FLUORESCENT FIXTURES

----- S Y S T E M S U M M A R Y -----

(Design Airflow Quantities)

System Number	System Type	Main					Auxil.	Room
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	SZ	1,684	15,553	15,653	19,580	5,611	0	0
2	PTAC	0	1,544	1,544	2,116	572	0	0
3	RAD	0	0	0	0	365	0	0
4	UH	0	0	6,035	0	2,238	0	0
Totals		1,684	17,097	23,232	21,696	8,786	0	0

CAPACITY - ALTERNATIVE 1
REPLACE FLUORESCENT FIXTURES

----- S Y S T E M S U M M A R Y -----

(Design Capacity Quantities)

System Number	System Type	Cooling				Heating						
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	SZ	45.5	0.0	0.0	45.5	-661,631	0	-71,327	0	0	0	-661,631
2	PTAC	6.0	0.0	0.0	6.0	-84,702	0	0	0	0	0	-84,702
3	RAD	0.0	0.0	0.0	0.0	-49,312	0	0	0	0	0	-49,312
4	UH	0.0	0.0	0.0	0.0	-349,136	0	0	0	0	0	-349,136
Totals		51.4	0.0	0.0	51.4	-1,144,780	0	-71,327	0	0	0	-1,144,780

The building peaked at hour 16 month 7 with a capacity of 51.3 tons

ENGINEERING CHECKS - ALTERNATIVE 1
REPLACE FLUORESCENT FIXTURES

----- E N G I N E E R I N G C H E C K S -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	Cooling				Heating		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	SZ	10.83	0.91	342.1	374.4	32.05	0.92	-38.86	17,026
2	Main	PTAC	0.00	1.11	258.8	232.5	51.60	1.11	-61.07	1,387
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-59.41	830
4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.61	-35.32	9,886

System 1 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)		Space Sensible (Btuh)	Perct Of Tot (%)		Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	121,793		121,793	22.32	*	0	0.00	*	0	-90,278	16.50
Glass Solar	67,392	0		67,392	12.35	*	73,968	24.15	*	0	0	0.00
Glass Cond	19,075	0		19,075	3.50	*	19,852	6.48	*	-95,233	-95,233	17.40
Wall Cond	18,084	3,570		21,654	3.97	*	19,556	6.38	*	-67,914	-88,294	16.13
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	151,003			151,003	27.67	*	66,238	21.62	*	-273,498	-273,498	49.97
Sub Total==>	255,553	125,364		380,916	69.81	*	179,614	58.64	*	-436,645	-547,303	100.00
Internal Loads												
Lights	69,574	0		69,574	12.75	*	72,814	23.77	*	0	0	0.00
People	32,175			32,175	5.90	*	15,332	5.01	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	101,749	0	0	101,749	18.65	*	88,146	28.78	*	0	0	0.00
Ceiling Load	42,025	-42,025		0	0.00	*	38,561	12.59	*	-30,777	0	0.00
Outside Air	0	0	0	66,046	12.10	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				12,166	2.23	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		-15,241	0	-15,241	-2.79	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	399,327	68,097	0	545,636	100.00	*	306,321	100.00	*	-467,422	-547,303	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total Floor	Glass (sf)	(%)
Main Clg	45.5	545.6	405.6	15,553 83.7 67.2 75.8	56.2 55.5 66.5	17,026		
Aux Clg	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Opt Vent	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	45.5	545.6				7,846	0	0
						5,950	1,776	30

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	Clg % OA	10.8	Type	Clg	Htg
Main Htg	-661.6	15,653	56.6	95.4	Vent	1,684	0	Clg Cfm/Sqft	0.91	SADB	56.9	95.4
Aux Htg	0.0	0	0.0	0.0	Infil	3,927	3,927	Clg Cfm/Ton	342.06	Plenum	82.8	58.5
Preheat	-71.3	15,553	52.0	56.2	Supply	15,553	15,653	Clg Sqft/Ton	374.45	Return	83.0	57.8
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	32.05	Ret/OA	83.7	57.8
Humidif	0.0	0	0.0	0.0	Return	15,553	15,653	No. People	61	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	1,684	0	Htg % OA	0.0	Fn MtrTD	0.2	0.2
Total	-661.6				Rm Exh	0	0	Htg Cfm/SqFt	0.92	Fn BldTD	0.1	0.1
					Auxil	0	0	Htg Btuh/SqFt	-38.86	Fn Frict	0.4	0.4

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/15 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	21,144		21,144	29.54	*	0	0.00	*	0	-17,552	20.64
Glass Solar	11,232	0		11,232	15.69	*	10,944	28.55	*	0	0	0.00
Glass Cond	3,009	0		3,009	4.20	*	3,180	8.30	*	-15,443	-15,443	18.16
Wall Cond	2,731	531		3,263	4.56	*	2,977	7.77	*	-9,254	-12,204	14.35
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	24,717			24,717	34.53	*	9,865	25.74	*	-39,853	-39,853	46.86
Sub Total==>	41,690	21,675		63,365	88.53	*	26,967	70.35	*	-64,550	-85,052	100.00
Internal Loads						*			*			
Lights	5,429	0		5,429	7.59	*	5,572	14.53	*	0	0	0.00
People	2,558			2,558	3.57	*	1,167	3.04	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	7,988	0	0	7,988	11.16	*	6,738	17.58	*	0	0	0.00
Ceiling Load	4,174	-4,174		0	0.00	*	4,628	12.07	*	-4,243	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				220	0.31	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	53,852	17,500	0	71,572	100.00	*	38,333	100.00	*	-68,793	-85,052	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	6.0	71.6	55.1	84.2 65.5 66.5	52.1 49.5 49.9	1,387		
Aux Clg	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	0		
Opt Vent	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	6.0	71.6				1,387	0	0
						867	288	33

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent			Clg Cfm/Sqft	1.11	SADB	52.2	109.0
Main Htg	-84.7	1,544	58.5	109.0	Infil	572	572	Clg Cfm/Ton	258.81	Plenum	84.5	58.4
Aux Htg	0.0	0	0.0	0.0	Supply	1,544	1,544	Clg Sqft/Ton	232.55	Return	84.1	58.5
Preheat	-0.0	1,544	58.5	52.0	Mincfm	0	0	Clg Btuh/Sqft	51.60	Ret/OA	84.1	58.5
Reheat	0.0	0	0.0	0.0	Return	1,544	1,544	No. People	5	Runarnd	75.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/SqFt	1.11	Fn BldTD	0.0	0.0
Total	-84.7				Auxil	0	0	Htg Btuh/SqFt	-61.07	Fn Frict	0.1	0.0

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 3 Block RAD - RADIATION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	-6,714	13.61
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-10,295	-10,295	20.88
Wall Cond	0	0		0	0.00	*	0	0.00	*	-5,711	-6,907	14.01
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-25,396	-25,396	51.50
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-41,403	-49,312	100.00
Internal Loads												
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	-7,805	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-49,208	-49,312	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Part	830	
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	0	
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Roof	830	0 0
Totals	0.0	0.0				Wall	553	192 35

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent			Clg Cfm/Sqft	0.00	SADB	0.0	68.1
Main Htg	-49.3	0	0.0	0.0	Infil	0	365	Clg Cfm/Ton	0.00	Plenum	0.0	38.8
Aux Htg	0.0	0	0.0	0.0	Supply	0	0	Clg Sqft/Ton	0.00	Return	0.0	39.0
Preheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	39.0
Reheat	0.0	0	0.0	0.0	Return	0	0	No. People	0	Runarnd	0.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	0.00	Fn BldTD	0.0	0.0
Total	-49.3				Auxil	0	0	Htg Btuh/Sqft	-59.41	Fn Frict	0.0	0.0

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 4 Block UH - UNIT HEATERS

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WH/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	-74,057	21.67
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-73,355	-73,355	21.47
Wall Cond	0	0		0	0.00	*	0	0.00	*	-30,899	-38,407	11.24
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-155,894	-155,894	45.62
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-260,148	-341,713	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	-84,880	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-345,028	-341,713	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WH/HR	Leaving DB/WH/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	9,886		
Aux Clg	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Opt Vent	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	0.0	0.0				8,985	0	0
						3,392	1,368	40

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent	0	0	Clg Cfm/Sqft	0.00	SADB	0.0	120.5
Main Htg	-349.1	6,035	67.4	120.5	Infil	0	2,238	Clg Cfm/Ton	0.00	Plenum	0.0	39.6
Aux Htg	0.0	0	0.0	0.0	Supply	0	6,035	Clg Sqft/Ton	0.00	Return	0.0	68.0
Preheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	68.0
Reheat	0.0	0	0.0	0.0	Return	0	6,035	No. People	0	Runarnd	0.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	0.61	Fn BldTD	0.0	0.0
Total	-349.1				Auxil	0	0	Htg Btuh/Sqft	-35.32	Fn Frict	0.0	0.1

BUILDING U-VALUES - ALTERNATIVE 1
REPLACE FLUORESCENT FIXTURES

----- B U I L D I N G U - V A L U E S -----

Room Number	Description	Part.	ExFlr	Room U-Values (Btu/hr/sqft/F)							Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
				Summr Skylt	Wintr Skylt	Roof	Summr Windo	Wintr Windo	Wall	Ceil.		
1	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	45.0	9.63
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	45.0	9.63
2	LIQUOR STORE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.343	0.317	100.3	21.77
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.343	0.317	100.3	21.77
4	LIBRARY	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
5	GAME ROOM	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	49.2	10.88
6	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
7	2ND FL OFFICE	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	75.9	17.16
7	2ND FL OFFICE	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	114.6	25.67
8	2ND FL TOILETS	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	62.6	14.24
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	62.6	14.24
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	78.1	17.65
3	LIQUOR STORAGE	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	29.8	6.29
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.317	29.8	6.29
4	LIBRARY	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	46.8	10.79
5	GAME ROOM	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	45.3	10.44
6	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	67.4	15.31
System	4 Total/Ave.	0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	47.0	10.75
Building		0.000	0.000	0.000	0.000	0.232	0.810	0.837	0.343	0.317	50.5	11.33

BUILDING AREAS - ALTERNATIVE 1
REPLACE FLUORESCENT FIXTURES

----- B U I L D I N G A R E A S -----													
Room Number	Description	Number of Duplicate		Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	1ST FL OFFICES	1	1	8,053	8,053	0	0	0	0	0	624	24	1,926
Zone	1 Total/Ave.				8,053	0	0	0	0	0	624	24	1,926
2	LIQUOR STORE	1	1	1,127	1,127	0	0	0	0	0	0	0	739
Zone	2 Total/Ave.				1,127	0	0	0	0	0	0	0	739
4	LIBRARY	1	1	3,692	3,692	0	0	0	0	3,692	576	44	733
Zone	4 Total/Ave.				3,692	0	0	0	0	3,692	576	44	733
5	GAME ROOM	1	1	4,154	4,154	0	0	0	0	4,154	576	43	775
Zone	5 Total/Ave.				4,154	0	0	0	0	4,154	576	43	775
System	1 Total/Ave.				17,026	0	0	0	0	7,846	1,776	30	4,174
6	2ND FL OFFICES	1	1	1,139	1,139	0	0	0	0	1,139	192	32	403
Zone	6 Total/Ave.				1,139	0	0	0	0	1,139	192	32	403
7	2ND FL OFFICE	1	1	248	248	0	0	0	0	248	96	35	176
Zone	7 Total/Ave.				248	0	0	0	0	248	96	35	176
System	2 Total/Ave.				1,387	0	0	0	0	1,387	288	33	579
7	2ND FL OFFICE	1	1	248	248	0	0	0	0	248	96	35	176
Zone	7 Total/Ave.				248	0	0	0	0	248	96	35	176
8	2ND FL TOILETS	1	1	582	582	0	0	0	0	582	96	34	184
Zone	8 Total/Ave.				582	0	0	0	0	582	96	34	184
System	3 Total/Ave.				830	0	0	0	0	830	192	35	360
3	LIQUOR STORAGE	1	1	901	901	0	0	0	0	0	24	18	112
Zone	3 Total/Ave.				901	0	0	0	0	0	24	18	112
4	LIBRARY	1	1	3,692	3,692	0	0	0	0	3,692	576	44	733
Zone	4 Total/Ave.				3,692	0	0	0	0	3,692	576	44	733
5	GAME ROOM	1	1	4,154	4,154	0	0	0	0	4,154	576	43	775
Zone	5 Total/Ave.				4,154	0	0	0	0	4,154	576	43	775
6	2ND FL OFFICES	1	1	1,139	1,139	0	0	0	0	1,139	192	32	403
Zone	6 Total/Ave.				1,139	0	0	0	0	1,139	192	32	403
System	4 Total/Ave.				9,886	0	0	0	0	8,985	1,368	40	2,023
Building					29,129	0	0	0	0	19,048	3,624	34	7,137

Trane Air Conditioning Economics
By: Trane Customer Direct Service Network

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ASHRAE 90 ANALYSIS - ALTERNATIVE 1
REPLACE FLUORESCENT FIXTURES

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.232 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.500 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.329 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTV_r) = 18.58 (Btu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTV_w) = 33.33 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1
REPLACE FLUORESCENT FIXTURES

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	2.6	12	92	-60,805	24	593	1,161.6	0	0	0.0	0	0
5 - 10	5.1	3	22	-121,611	28	671	2,323.2	0	0	0.0	0	0
10 - 15	7.7	9	67	-182,416	19	473	3,484.9	0	0	0.0	0	0
15 - 20	10.3	0	0	-243,221	2	58	4,646.5	0	0	0.0	0	0
20 - 25	12.9	14	105	-304,027	2	40	5,808.1	0	0	0.0	0	0
25 - 30	15.4	3	23	-364,832	3	64	6,969.7	59	3,638	0.0	0	0
30 - 35	18.0	7	53	-425,637	1	32	8,131.3	0	0	0.0	0	0
35 - 40	20.6	5	41	-486,443	0	3	9,292.9	0	0	0.0	0	0
40 - 45	23.1	4	32	-547,248	1	21	10,454.6	0	0	0.0	0	0
45 - 50	25.7	11	81	-608,054	1	30	11,616.2	0	0	0.0	0	0
50 - 55	28.3	9	67	-668,859	11	279	12,777.8	0	0	0.0	0	0
55 - 60	30.9	5	42	-729,664	7	166	13,939.4	24	1,450	0.0	0	0
60 - 65	33.4	2	18	-790,469	0	0	15,101.0	0	0	0.0	0	0
65 - 70	36.0	5	40	-851,275	0	0	16,262.6	0	0	0.0	0	0
70 - 75	38.6	6	45	-912,080	0	0	17,424.3	17	1,070	0.0	0	0
75 - 80	41.1	2	15	-972,886	0	0	18,585.9	0	0	0.0	0	0
80 - 85	43.7	1	5	-1,033,691	0	0	19,747.5	0	0	0.0	0	0
85 - 90	46.3	3	20	-1,094,496	0	0	20,909.1	0	0	0.0	0	0
90 - 95	48.9	0	0	-1,155,302	0	0	22,070.7	0	0	0.0	0	0
95 - 100	51.4	0	0	-1,216,107	0	0	23,232.3	0	0	0.0	0	0
Hours Off	0.0	0	7,992	0	0	6,330	0.0	0	2,602	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1
REPLACE FLUORESCENT FIXTURES

----- B U I L D I N G T E M P E R A T U R E P R O F I L E S -----													
Temperature	----- Zone Number -----												
Range (F)	1	2	4	5	6	7	7	8	3	4	5	6	
Max. Temp.	83.4	81.1	89.8	88.9	87.2	87.5	103.0	102.0	118.6	106.7	105.5	102.1	
Mo./Hr.	7 20	7 22	7 20	7 20	7 19	7 20	8 20	8 20	8 19	7 21	7 20	7 18	
Day Type	4	4	4	4	4	4	1	1	2	1	1	2	
	..... Number of Hours												
Above 100	0	0	0	0	0	0	325	228	2,808	873	479	219	
95 - 100	0	0	0	0	0	0	1,196	1,065	120	1,024	1,061	1,111	
90 - 95	0	0	0	0	0	0	1,133	1,060	186	728	676	998	
85 - 90	0	0	199	154	110	132	408	517	668	624	701	473	
80 - 85	585	257	1,414	1,178	902	1,045	610	802	334	423	653	805	
75 - 80	2,651	2,370	1,812	1,906	2,225	2,217	17	0	80	17	102	66	
70 - 75	504	1,045	417	434	435	346	254	117	1,152	519	162	67	
65 - 70	2,194	2,130	550	455	416	435	1,980	2,013	1,960	1,744	1,900	2,003	
60 - 65	1,098	1,315	810	646	649	1,028	1,074	1,119	637	1,039	983	1,094	
55 - 60	704	769	607	641	760	525	779	785	287	764	860	812	
50 - 55	380	344	790	664	629	892	984	1,054	528	1,005	1,183	1,112	
Below 50	644	530	2,161	2,682	2,634	2,140	0	0	0	0	0	0	
Min. Temp.	36.8	38.9	34.2	31.9	32.9	36.0	54.9	54.9	54.9	54.9	54.9	54.9	
Mo./Hr.	2 7	2 7	2 10	2 10	2 8	2 9	1 5	1 5	1 23	1 5	1 4	1 5	
Day Type	5	5	4	4	5	5	2	2	3	2	2	2	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1
REPLACE FLUORESCENT FIXTURES

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	HOT WTR	HOT W DMND
	Off Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	9,089	47	1,335	7
Feb	8,223	47	1,271	7
March	9,948	47	756	7
April	8,646	47	192	7
May	11,302	116	0	0
June	15,347	126	0	0
July	18,390	129	0	0
Aug	16,055	126	0	0
Sept	10,281	122	0	0
Oct	9,510	47	135	7
Nov	8,649	47	509	7
Dec	8,656	47	1,092	7
Total	134,095	129	5,291	7

Building Energy Consumption = 33,876 (Btu/Sq Ft/Year)
Source Energy Consumption = 71,359 (Btu/Sq Ft/Year)

Floor Area = 29,129 (Sq Ft)

----- EQUIPMENT ENERGY CONSUMPTION -----

Ref Num	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	8396	7596	9195	7996	8796	8796	7996	9195	7996	8796	7996	7996	100,748
	PK	43.7	43.7	43.7	43.7	43.7	43.7	43.7	43.7	43.7	43.7	43.7	43.7	43.7
1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH2O	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1161		AIR-CLD COND COMP <15 TONS											
	ELEC	0	0	0	0	695	3886	7111	4049	624	0	0	0	16,365
	PK	0.0	0.0	0.0	0.0	58.6	60.9	63.0	61.1	58.8	0.0	0.0	0.0	63.0
1	EQ5200		CONDENSER FANS											
	ELEC	0	0	0	0	73	361	688	383	66	0	0	0	1,571
	PK	0.0	0.0	0.0	0.0	2.4	4.6	5.6	4.6	3.4	0.0	0.0	0.0	5.6
1	EQ5303		CONTROLS											
	ELEC	0	0	0	0	19	66	60	69	17	0	0	0	230
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
2	EQ1161		AIR-CLD COND COMP <15 TONS											
	ELEC	0	0	0	0	53	490	897	528	57	0	0	0	2,025
	PK	0.0	0.0	0.0	0.0	7.2	8.0	8.3	8.0	7.7	0.0	0.0	0.0	8.3
2	EQ5200		CONDENSER FANS											
	ELEC	0	0	0	0	6	46	87	51	6	0	0	0	195
	PK	0.0	0.0	0.0	0.0	0.2	0.6	0.7	0.6	0.5	0.0	0.0	0.0	0.7
2	EQ5303		CONTROLS											

[illegible]

UTILITY PEAK CHECKSUMS - ALTERNATIVE 1
REPLACE FLUORESCENT FIXTURES

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 129.3 (kW)
Yearly Time of Peak 15 (hr) 7 (mo)

Hour 15 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Perct Of Tot (%)
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Cooling Equipment

1	EQ1161	AIR-CLD COND COMP <15 TONS	68.9	53.26
2	EQ1161	AIR-CLD COND COMP <15 TONS	9.3	7.18

Sub Total			78.1	60.44
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Sub Total			0.0	0.00
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Air Moving Equipment

1		SUMMATION OF FAN ELECTRICAL DEMAND	7.3	5.66
2		SUMMATION OF FAN ELECTRICAL DEMAND	0.1	0.10

Sub Total			7.5	5.77
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Sub Total			0.0	0.00
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Miscellaneous

Lights			43.7	33.80
Base Utilities			0.0	0.00
Misc Equipment			0.0	0.00
Sub Total			43.7	33.80

Grand Total			129.3	100.00
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**          T R A C E    6 0 0    A N A L Y S I S          **
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 46

Weather File Code:	CARLISLE
Location:	ENERGY SAVINGS OPPORTUNITY STUDY
Latitude:	40.2 (deg)
Longitude:	77.2 (deg)
Time Zone:	5
Elevation:	475 (ft)
Barometric Pressure:	29.2 (in. Hg)
Summer Clearness Number:	1.00
Winter Clearness Number:	1.00
Summer Design Dry Bulb:	92 (F)
Summer Design Wet Bulb:	72 (F)
Winter Design Dry Bulb:	4 (F)
Summer Ground Reflectance:	0.20
Winter Ground Reflectance:	0.20
Air Density:	0.0742 (Lbm/cuft)
Air Specific Heat:	0.2444 (Btu/lbm/F)
Density-Specific Heat Prod:	1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor:	4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor:	4.4519 (Lb-min./hr/cuft)
Design Simulation Period:	May To September
System Simulation Period:	January To December
Cooling Load Methodology:	CLTD/CLF (Transfer Function Method)
Time/Date Program was Run:	8: 5:52 1/14/94
Dataset Name:	CB46B .TM

AIRFLOW - ALTERNATIVE 2
COMBINED ECOS

----- S Y S T E M S U M M A R Y -----

(Design Airflow Quantities)

System Number	System Type	Main					Auxil. Supply	Room Exhaust
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Airflow (Cfm)	Airflow (Cfm)
1	SZ	1,493	14,281	14,381	17,415	4,528	0	0
2	PTAC	0	1,326	1,326	1,769	442	0	0
3	RAD	0	0	0	0	282	0	0
4	UH	0	0	4,192	0	1,730	0	0
Totals		1,493	15,607	19,899	19,184	6,981	0	0

CAPACITY - ALTERNATIVE 2
COMBINED ECOS

----- S Y S T E M S U M M A R Y -----

(Design Capacity Quantities)

System Number	System Type	Cooling				Heating						
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	SZ	32.4	0.0	0.0	32.4	-372,971	0	0	0	0	0	-372,971
2	PTAC	3.7	0.0	0.0	3.7	-51,958	0	0	0	0	0	-51,958
3	RAD	0.0	0.0	0.0	0.0	-33,113	0	0	0	0	0	-33,113
4	UH	0.0	0.0	0.0	0.0	-223,775	0	0	0	0	0	-223,775
Totals		36.1	0.0	0.0	36.1	-681,816	0	0	0	0	0	-681,816

The building peaked at hour 16 month 7 with a capacity of 35.4 tons

ENGINEERING CHECKS - ALTERNATIVE 2
COMBINED ECOS

----- E N G I N E E R I N G C H E C K S -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	Cooling				Heating		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	SZ	10.46	0.84	440.5	525.2	22.85	0.84	-21.91	17,026
2	Main	PTAC	0.00	0.96	357.1	373.3	32.14	0.96	-37.46	1,387
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-39.90	830
4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.42	-22.64	9,886

System 1 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	23,745		23,745	6.10	*	0	0.00	*	0	-19,416	5.69
Glass Solar	70,848	0		70,848	18.21	*	73,968	30.44	*	0	0	0.00
Glass Cond	19,448	0		19,448	5.00	*	19,852	8.17	*	-95,233	-95,233	27.90
Wall Cond	3,242	1,044		4,287	1.10	*	3,301	1.36	*	-11,470	-15,342	4.49
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	106,222			106,222	27.31	*	51,389	21.15	*	-211,340	-211,340	61.92
Sub Total==>	199,760	24,789		224,549	57.72	*	148,510	61.12	*	-318,043	-341,330	100.00
Internal Loads												
Lights	70,391	0		70,391	18.10	*	72,568	29.86	*	0	0	0.00
People	32,391			32,391	8.33	*	15,271	6.28	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	102,782	0	0	102,782	26.42	*	87,839	36.15	*	0	0	0.00
Ceiling Load	8,220	-8,220		0	0.00	*	6,644	2.73	*	-6,212	0	0.00
Outside Air	0	0	0	53,222	13.68	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				11,171	2.87	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		-2,720	0	-2,720	-0.70	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	310,762	13,849	0	389,004	100.00	*	242,993	100.00	*	-324,255	-341,331	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor	
Main Clg	32.4	389.0	288.3	14,281	78.0	66.1	79.5	58.6	57.5	70.7	17,026	
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0	
Totals	32.4	389.0									7,846	0 0
											5,950	1,776 30

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	--ENGINEERING CHECKS--			--TEMPERATURES (F)---		
	(Mbh)	(cfm)	Deg F	Deg F				Clg % OA	10.5	Type	Clg	Htg	
Main Htg	-373.0	14,381	64.9	88.7	Vent	1,493	0	Clg Cfm/Sqft	0.84	SADB	59.4	88.7	
Aux Htg	0.0	0	0.0	0.0	Infil	3,035	3,035	Clg Cfm/Ton	440.54	Plenum	76.5	65.7	
Preheat	-0.0	14,281	58.9	58.6	Supply	14,281	14,381	Clg Sqft/Ton	525.22	Return	76.6	65.3	
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	22.85	Ret/OA	78.0	65.3	
Humidif	0.0	0	0.0	0.0	Return	14,281	14,381	No. People	61	Runarnd	75.0	68.0	
Opt Vent	0.0	0	0.0	0.0	Exhaust	1,493	0	Htg % OA	0.0	Fn MtrTD	0.2	0.2	
Total	-373.0				Rm Exh	0	0	Htg Cfm/Sqft	0.84	Fn BldTD	0.1	0.1	
					Auxil	0	0	Htg Btuh/Sqft	-21.91	Fn Frict	0.4	0.4	

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/15 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	3,458		3,458	7.76	*	0	0.00	*	0	-3,527	6.80
Glass Solar	11,232	0		11,232	25.19	*	11,520	38.44	*	0	0	0.00
Glass Cond	3,009	0		3,009	6.75	*	3,056	10.20	*	-15,443	-15,443	29.76
Wall Cond	462	157		619	1.39	*	469	1.57	*	-1,563	-2,128	4.10
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	18,086			18,086	40.57	*	7,458	24.89	*	-30,795	-30,795	59.34
Sub Total==>	32,789	3,615		36,404	81.66	*	22,503	75.09	*	-47,801	-51,893	100.00
Internal Loads												
Lights	5,429	0		5,429	12.18	*	5,455	18.20	*	0	0	0.00
People	2,558			2,558	5.74	*	1,132	3.78	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	7,988	0	0	7,988	17.92	*	6,587	21.98	*	0	0	0.00
Ceiling Load	796	-796		0	0.00	*	879	2.93	*	-955	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				189	0.42	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	41,573	2,819	0	44,581	100.00	*	29,969	100.00	*	-48,757	-51,893	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor	
Main Clg	3.7	44.6	32.5	1,326	76.8	63.8	70.2	54.2	52.4	57.2	1,387	
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0	
Totals	3.7	44.6									1,387	
											0	
											0	
											1,387	0 0
											867	288 33

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	ENGINEERING CHECKS--			TEMPERATURES (F)---		
	(Mbh)	(cfm)	Deg F	Deg F				Clg % OA	0.0		Type	Clg	Htg
Main Htg	-52.0	1,326	65.8	101.8	Vent	0	0	Clg Cfm/Sqft	0.96		SADB	54.2	101.8
Aux Htg	0.0	0	0.0	0.0	Infil	442	442	Clg Cfm/Ton	357.06		Plenum	76.8	65.8
Preheat	-0.0	1,326	65.8	54.1	Supply	1,326	1,326	Clg Sqft/Ton	373.35		Return	76.8	65.8
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	32.14		Ret/OA	76.8	65.8
Humidif	0.0	0	0.0	0.0	Return	1,326	1,326	No. People	5		Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0		Fn MtrTD	0.0	0.0
Total	-52.0				Rm Exh	0	0	Htg Cfm/Sqft	0.96		Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/Sqft	-37.46		Fn Frict	0.1	0.0

System 3 Block RAD - RADIATION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads						*			*			
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	-1,904	5.75
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-10,295	-10,295	31.09
Wall Cond	0	0		0	0.00	*	0	0.00	*	-965	-1,289	3.89
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-19,624	-19,624	59.26
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-30,884	-33,113	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	-2,221	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-33,105	-33,113	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total Floor	Glass (sf)	(%)
Main Clg	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	Part	0	
Aux Clg	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	0	
Opt Vent	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	Roof	830	0 0
Totals	0.0	0.0				Wall	553	192 35

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
Main Htg	-33.1	0	0.0	0.0	Vent	0	0	Clg Cfm/Sqft	0.00	SADB	0.0	68.1
Aux Htg	0.0	0	0.0	0.0	Infil	0	282	Clg Cfm/Ton	0.00	Plenum	0.0	59.8
Preheat	0.0	0	0.0	0.0	Supply	0	0	Clg Sqft/Ton	0.00	Return	0.0	59.9
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	59.9
Humidif	0.0	0	0.0	0.0	Return	0	0	No. People	0	Runarnd	0.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-33.1				Rm Exh	0	0	Htg Cfm/Sqft	0.00	Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/Sqft	-39.90	Fn Frict	0.0	0.0

System 4 Block UH - UNIT HEATERS

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	-20,721	9.34
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-73,355	-73,355	33.08
Wall Cond	0	0		0	0.00	*	0	0.00	*	-5,219	-7,222	3.26
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-120,464	-120,464	54.32
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-199,037	-221,762	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	-22,976	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-222,013	-221,762	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
				Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor	9,886	
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	Part	0	
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	Exflr	0	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	Roof	8,985	0 0
Totals	0.0	0.0								Wall	3,392	1,368 40

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	--ENGINEERING CHECKS--		--TEMPERATURES (F)--		
								Clg % OA	0.0	Type	Clg	Htg
Main Htg	-223.8	4,192	67.6	116.7	Vent	0	0	Clg Cfm/Sqft	0.00	SADB	0.0	116.7
Aux Htg	0.0	0	0.0	0.0	Infil	0	1,730	Clg Cfm/Ton	0.00	Plenum	0.0	60.1
Preheat	0.0	0	0.0	0.0	Supply	0	4,192	Clg Sqft/Ton	0.00	Return	0.0	68.0
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	68.0
Humidif	0.0	0	0.0	0.0	Return	0	4,192	No. People	0	Runarnd	0.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-223.8				Rm Exh	0	0	Htg Cfm/Sqft	0.42	Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/Sqft	-22.64	Fn Frict	0.0	0.1

BUILDING U-VALUES - ALTERNATIVE 2
COMBINED ECOS

----- B U I L D I N G U - V A L U E S -----

Room Number	Description	Room U-Values (Btu/hr/sqft/F)									Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
		Part.	ExFlr	Summr Skylt	Wintr Skylt	Roof	Summr Windo	Wintr Windo	Wall	Ceil.		
1	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.317	45.6	9.75
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.317	45.6	9.75
2	LIQUOR STORE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.058	0.317	101.9	22.09
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.058	0.317	101.9	22.09
4	LIBRARY	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	48.3	11.08
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	48.3	11.08
5	GAME ROOM	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	46.7	10.73
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	46.7	10.73
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	50.2	11.09
6	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	69.3	15.68
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	69.3	15.68
7	2ND FL OFFICE	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	117.3	26.22
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	117.3	26.22
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	77.9	17.56
7	2ND FL OFFICE	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	117.3	26.22
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	117.3	26.22
8	2ND FL TOILETS	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	64.3	14.59
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	64.3	14.59
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	80.2	18.06
3	LIQUOR STORAGE	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.317	30.1	6.35
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.317	30.1	6.35
4	LIBRARY	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	48.3	11.08
Zone	4 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	48.3	11.08
5	GAME ROOM	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	46.7	10.73
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	46.7	10.73
6	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	69.3	15.68
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	69.3	15.68
System	4 Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	48.4	11.03
Building		0.000	0.000	0.000	0.000	0.041	0.810	0.837	0.058	0.317	51.8	11.58

BUILDING AREAS - ALTERNATIVE 2
COMBINED ECOS

----- B U I L D I N G A R E A S -----													
Room Number	Description	Number of Duplicate Flr Rm		Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	1ST FL OFFICES	1	1	8,053	8,053	0	0	0	0	0	624	24	1,926
Zone	1 Total/Ave.				8,053	0	0	0	0	0	624	24	1,926
2	LIQUOR STORE	1	1	1,127	1,127	0	0	0	0	0	0	0	739
Zone	2 Total/Ave.				1,127	0	0	0	0	0	0	0	739
4	LIBRARY	1	1	3,692	3,692	0	0	0	0	3,692	576	44	733
Zone	4 Total/Ave.				3,692	0	0	0	0	3,692	576	44	733
5	GAME ROOM	1	1	4,154	4,154	0	0	0	0	4,154	576	43	775
Zone	5 Total/Ave.				4,154	0	0	0	0	4,154	576	43	775
System	1 Total/Ave.				17,026	0	0	0	0	7,846	1,776	30	4,174
6	2ND FL OFFICES	1	1	1,139	1,139	0	0	0	0	1,139	192	32	403
Zone	6 Total/Ave.				1,139	0	0	0	0	1,139	192	32	403
7	2ND FL OFFICE	1	1	248	248	0	0	0	0	248	96	35	176
Zone	7 Total/Ave.				248	0	0	0	0	248	96	35	176
System	2 Total/Ave.				1,387	0	0	0	0	1,387	288	33	579
7	2ND FL OFFICE	1	1	248	248	0	0	0	0	248	96	35	176
Zone	7 Total/Ave.				248	0	0	0	0	248	96	35	176
8	2ND FL TOILETS	1	1	582	582	0	0	0	0	582	96	34	184
Zone	8 Total/Ave.				582	0	0	0	0	582	96	34	184
System	3 Total/Ave.				830	0	0	0	0	830	192	35	360
3	LIQUOR STORAGE	1	1	901	901	0	0	0	0	0	24	18	112
Zone	3 Total/Ave.				901	0	0	0	0	0	24	18	112
4	LIBRARY	1	1	3,692	3,692	0	0	0	0	3,692	576	44	733
Zone	4 Total/Ave.				3,692	0	0	0	0	3,692	576	44	733
5	GAME ROOM	1	1	4,154	4,154	0	0	0	0	4,154	576	43	775
Zone	5 Total/Ave.				4,154	0	0	0	0	4,154	576	43	775
6	2ND FL OFFICES	1	1	1,139	1,139	0	0	0	0	1,139	192	32	403
Zone	6 Total/Ave.				1,139	0	0	0	0	1,139	192	32	403
System	4 Total/Ave.				9,886	0	0	0	0	8,985	1,368	40	2,023
Building					29,129	0	0	0	0	19,048	3,624	34	7,137

ASHRAE 90 ANALYSIS - ALTERNATIVE 2
COMBINED ECOS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.041 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.311 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.139 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 2.27 (Btu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTVw) = 32.24 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2
COMBINED ECOS

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	1.8	5	38	-34,091	22	432	994.9	0	0	0.0	0	0
5 - 10	3.6	3	22	-68,182	25	481	1,989.9	0	0	0.0	0	0
10 - 15	5.4	6	53	-102,272	18	343	2,984.8	0	0	0.0	0	0
15 - 20	7.2	10	84	-136,363	1	15	3,979.8	0	0	0.0	0	0
20 - 25	9.0	8	62	-170,454	2	43	4,974.7	59	3,638	0.0	0	0
25 - 30	10.8	8	66	-204,545	2	30	5,969.7	0	0	0.0	0	0
30 - 35	12.6	4	36	-238,636	1	28	6,964.6	0	0	0.0	0	0
35 - 40	14.5	5	38	-272,727	1	23	7,959.6	0	0	0.0	0	0
40 - 45	16.3	7	54	-306,817	1	21	8,954.5	0	0	0.0	0	0
45 - 50	18.1	6	46	-340,908	1	24	9,949.5	24	1,450	0.0	0	0
50 - 55	19.9	9	71	-374,999	1	23	10,944.4	0	0	0.0	0	0
55 - 60	21.7	6	50	-409,090	2	46	11,939.4	0	0	0.0	0	0
60 - 65	23.5	4	31	-443,181	22	434	12,934.3	0	0	0.0	0	0
65 - 70	25.3	2	15	-477,272	0	0	13,929.3	0	0	0.0	0	0
70 - 75	27.1	8	65	-511,362	0	0	14,924.2	0	0	0.0	0	0
75 - 80	28.9	5	42	-545,453	0	0	15,919.2	17	1,070	0.0	0	0
80 - 85	30.7	0	0	-579,544	0	0	16,914.1	0	0	0.0	0	0
85 - 90	32.5	0	0	-613,635	0	0	17,909.1	0	0	0.0	0	0
90 - 95	34.3	2	20	-647,726	0	0	18,904.0	0	0	0.0	0	0
95 - 100	36.1	3	25	-681,817	0	0	19,899.0	0	0	0.0	0	0
Hours Off	0.0	0	7,942	0	0	6,817	0.0	0	2,602	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2
COMBINED ECOS

----- B U I L D I N G T E M P E R A T U R E P R O F I L E S -----													
Temperature	----- Zone Number -----												
Range (F)	1	2	4	5	6	7	7	8	3	4	5	6	
Max. Temp.	83.0	79.1	87.5	86.1	84.9	86.5	106.8	105.7	143.9	110.3	108.2	105.8	
Mo./Hr.	7 21	7 23	7 21	7 20	7 20	7 20	8 20	8 21	9 19	8 21	7 20	8 19	
Day Type	4	1	4	4	4	4	1	1	2	1	2	1	
..... Number of Hours													
Above 100	0	0	0	0	0	0	1,759	1,237	2,928	2,035	1,418	1,254	
95 - 100	0	0	0	0	0	0	825	993	44	730	1,146	1,072	
90 - 95	0	0	0	0	0	0	344	690	697	191	163	562	
85 - 90	0	0	126	63	0	69	141	44	347	467	521	84	
80 - 85	486	0	1,367	1,137	651	1,019	491	526	517	334	424	502	
75 - 80	2,911	2,682	2,150	2,222	2,496	2,312	520	573	552	339	85	419	
70 - 75	803	1,075	461	539	780	692	149	101	1,352	464	471	231	
65 - 70	2,159	2,294	612	195	254	281	2,173	2,203	1,462	2,037	1,907	2,011	
60 - 65	1,154	1,444	825	1,052	840	1,117	1,006	1,089	330	904	1,143	1,221	
55 - 60	536	670	559	418	650	422	660	616	320	566	640	646	
50 - 55	338	407	1,297	937	855	1,444	692	688	211	693	842	758	
Below 50	373	188	1,363	2,197	2,234	1,404	0	0	0	0	0	0	
Min. Temp.	41.6	44.3	37.1	33.8	34.8	37.8	54.9	54.9	54.9	54.9	54.9	54.9	
Mo./Hr.	2 7	2 7	2 8	2 8	2 8	2 9	1 9	1 11	1 14	1 10	1 10	1 11	
Day Type	5	5	5	5	5	5	3	3	4	3	3	3	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2
COMBINED ECOS

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	HOT WTR	HOT W DMND
	Off Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	8,956	46	795	4
Feb	8,103	46	773	4
March	9,805	46	452	4
April	8,524	46	85	4
May	11,007	92	0	0
June	14,276	103	0	0
July	16,380	106	0	0
Aug	15,202	103	0	0
Sept	10,451	101	0	0
Oct	9,376	46	59	4
Nov	8,525	46	259	4
Dec	8,529	46	628	4
Total	129,136	106	3,052	4

Building Energy Consumption = 25,607 (Btu/Sq Ft/Year)
Source Energy Consumption = 59,365 (Btu/Sq Ft/Year)

Floor Area = 29,129 (Sq Ft)

[illegible]

UTILITY PEAK CHECKSUMS - ALTERNATIVE 2
COMBINED ECOS

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 105.6 (kW)
Yearly Time of Peak 15 (hr) 7 (mo)

Hour 15 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Percent Of Tot (%)
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Cooling Equipment

1	EQ1161	AIR-CLD COND COMP <15 TONS	49.2	46.56
2	EQ1161	AIR-CLD COND COMP <15 TONS	5.9	5.58

Sub Total			55.1	52.15
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Sub Total			0.0	0.00
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Air Moving Equipment

1		SUMMATION OF FAN ELECTRICAL DEMAND	6.7	6.37
2		SUMMATION OF FAN ELECTRICAL DEMAND	0.1	0.11

Sub Total			6.8	6.47
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Sub Total			0.0	0.00
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Miscellaneous

Lights			43.7	41.38
Base Utilities			0.0	0.00
Misc Equipment			0.0	0.00
Sub Total			43.7	41.38

Grand Total			105.6	100.00
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Building 101
(Typical for 102, 103, 104, 105, 106,
107, 108, 109, 110, 111,
112, 113, and 114)

Trace Input File

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LINE # -----

1 JOB - 1

2 01/ENERGY SAVINGS OPPORTUNITY STUDY

3 01/CARLISLE BARRACKS, PA

4 01/DEPARTMENT OF THE ARMY

5 01/BENATEC ASSOCIATES

6 01/BUILDINGS 101-114

7 08/CARLISLE

8 09/MAY/SEP////APR/OCT

9 10/CLTD-CLF

10 11///ZONE

11 LOAD - 1

12 19/1/BASE BUILDING

13 20/1/1/TV ROOM/160/1/1/0//9.5

14 20/2/1/LIVING ROOM/280/1/1/.75/.45/9.5

15 20/3/1/LIVING ROOM/280/1/1/.75/.45/9.5

16 20/4/1/TV ROOM/160/1/1/0//9.5

17 20/5/1/BEDROOM/156/1/1/0//9

18 20/6/1/BEDROOM/145/1/1/0//9

19 20/7/1/BEDROOM/156/1/1/0//9

20 20/8/1/BEDROOM/145/1/1/0//9

21 20/9/2/DINING ROOM/148/1/1/.75/.45/9.5

22 20/10/2/KITCHEN/108/1/1/.75/.45/9.5

23 20/11/2/KITCHEN/108/1/1/.75/.45/9.5

24 20/12/2/DINING ROOM/148/1/1/.75/.45/9.5

25 20/13/2/REAR FOYER/33/1/2/0//9.5

26 20/14/2/REAR FOYER/33/1/2/0//9.5

27 20/15/2/BEDROOM/80/1/1/0//9

28 20/16/2/BEDROOM/80/1/1/0//9

29 20/17/2/HALL/70/1/1/0//9

30 20/18/2/HALL/70/1/1/0//9

31 20/19/2/BATH/53/1/1/0//9

32 20/20/2/BATH/53/1/1/0//9

33 21/M////CBLQTX//CBLQTX

34 22/1/1/YES////171

35 22/4/1/YES////171

36 22/5/1/YES////171

37 22/6/1/YES////171

38 22/7/1/YES////171

39 22/8/1/YES////171

40 22/13/1/YES////171

41 22/14/1/YES////171

42 22/15/1/YES////171

43 22/16/1/YES////171

44 22/17/1/YES////171

45 22/18/1/YES////171

46 22/19/1/YES////171

47 22/20/1/YES////171

48 24/1/1/10/8.5//170/0

49 24/1/2/16/8.5//170/270

50 24/1/3/10/8.5//170/180

51 24/2/1/12/8.5//170/180

52 24/3/1/12/8.5//170/180

53 24/4/1/10/8.5//170/0

54 24/4/2/16/8.5//170/90

55 24/4/3/10/8.5//170/180

56 24/5/1/11/8.25//170/0

57 24/5/2/12/8.25//170/270

58 24/6/1/12/8.25//170/270

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LINE #	
59	24/6/2/12/8.25//170/180
60	24/7/1/11/8.25//170/0
61	24/7/2/12/8.25//170/90
62	24/8/1/12/8.25//170/90
63	24/8/2/12/8.25//170/180
64	24/9/1/11/8.5//170/0
65	24/9/2/11/8.5//170/270
66	24/12/1/11/8.5//170/0
67	24/12/2/11/8.5//170/90
68	24/13/1/5/8.5//170/270
69	24/13/2/6/8.5//170/180
70	24/14/1/5/8.5//170/90
71	24/14/2/8/8.5//170/180
72	24/15/1/8/8.25//170/0
73	24/16/1/8/8.25//170/0
74	24/19/1/7/8.25//170/180
75	24/20/1/7/8.25//170/180
76	25/1/1/20/1/1/.81/.64
77	25/1/2/5/2.5/3/.81/.64
78	25/1/3/20/1/1/.81/.64
79	25/2/1/20/1/1/.81/.64
80	25/3/1/20/1/1/.81/.64
81	25/4/1/20/1/1/.81/.64
82	25/4/2/5/2.5/1/.81/.64
83	25/4/3/20/1/1/.81/.64
84	25/5/1/4/2.5/1/.81/.64
85	25/5/2/4/2.5/1/.81/.64
86	25/6/1/4/2.5/1/.81/.64
87	25/6/2/4/2.5/1/.81/.64
88	25/7/1/4/2.5/1/.81/.64
89	25/7/2/4/2.5/1/.81/.64
90	25/8/1/4/2.5/1/.81/.64
91	25/8/2/4/2.5/1/.81/.64
92	25/9/1/5/2.5/1/.81/.64
93	25/9/2/5/2.5/1/.81/.64
94	25/12/1/5/2.5/1/.81/.64
95	25/12/2/5/2.5/1/.81/.64
96	25/13/1/3.5/1/1/.81/.64
97	25/13/2/5/2.5/1/.81/.64
98	25/14/1/3.5/1/1/.81/.64
99	25/14/2/5/2.5/1/.81/.64
100	25/15/1/4/2.5/1/.81/.64
101	25/16/1/4/2.5/1/.81/.64
102	25/19/1/4/2.5/1/.81/.64
103	25/20/1/4/2.5/1/.81/.64
104	26/M/CBLQP/CBLQL/CBLQCLG//OFF/CBLQCLG/OFF/OFF/OFF/OFF
105	27/M/308/SF-PERS/230/190/.5/WATT-SF/INCAND
106	29/1/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF
107	29/2/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF
108	29/3/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF
109	29/4/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF
110	29/5/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF
111	29/6/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF
112	29/7/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF
113	29/8/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF
114	29/9////////.28/CFM-SF
115	29/10////////.28/CFM-SF
116	29/11////////.28/CFM-SF

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LINE #	
117	29/12////////.28/CFM-SF
118	29/13////////.28/CFM-SF
119	29/14////////.28/CFM-SF
120	29/15////////.28/CFM-SF
121	29/16////////.28/CFM-SF
122	29/17////////.28/CFM-SF
123	29/18////////.28/CFM-SF
124	29/19////////.28/CFM-SF
125	29/20////////.28/CFM-SF
126	SYSTEM - 1
127	39/1/BASE BUILDING
128	40/1/PTAC
129	41/1/1/1
130	42/1/.25
131	45/1/CBLQCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
132	40/2/RAD
133	41/2/1/2
134	45/2/OFF/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF
135	EQUIPMENT - 1
136	59/1/CARLISLE///BASE BUILDING
137	60/1/1/PKPLANT/1/1
138	62/1/EQ1161/6
139	65/1/1/2/2
140	67/1/EQ2102/1
141	69/1/EQ4003
142	LOAD - 2
143	19/2/WALL & ROOF INSULATION
144	20/1/1/TV ROOM/160/1/1/0//9.5
145	20/2/1/LIVING ROOM/280/1/1/.75/.45/9.5
146	20/3/1/LIVING ROOM/280/1/1/.75/.45/9.5
147	20/4/1/TV ROOM/160/1/1/0//9.5
148	20/5/1/BEDROOM/156/1/1/0//9
149	20/6/1/BEDROOM/145/1/1/0//9
150	20/7/1/BEDROOM/156/1/1/0//9
151	20/8/1/BEDROOM/145/1/1/0//9
152	20/9/2/DINING ROOM/148/1/1/.75/.45/9.5
153	20/10/2/KITCHEN/108/1/1/.75/.45/9.5
154	20/11/2/KITCHEN/108/1/1/.75/.45/9.5
155	20/12/2/DINING ROOM/148/1/1/.75/.45/9.5
156	20/13/2/REAR FOYER/33/1/2/0//9.5
157	20/14/2/REAR FOYER/33/1/2/0//9.5
158	20/15/2/BEDROOM/80/1/1/0//9
159	20/16/2/BEDROOM/80/1/1/0//9
160	20/17/2/HALL/70/1/1/0//9
161	20/18/2/HALL/70/1/1/0//9
162	20/19/2/BATH/53/1/1/0//9
163	20/20/2/BATH/53/1/1/0//9
164	21/M///CBLQTX///CBLQTX
165	22/1/1/YES////191
166	22/4/1/YES////191
167	22/5/1/YES////191
168	22/6/1/YES////191
169	22/7/1/YES////191
170	22/8/1/YES////191
171	22/13/1/YES////191
172	22/14/1/YES////191
173	22/15/1/YES////191
174	22/16/1/YES////191

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LINE #	
175	22/17/1/YES////191
176	22/18/1/YES////191
177	22/19/1/YES////191
178	22/20/1/YES////191
179	24/1/1/10/8.5//183/0
180	24/1/2/16/8.5//183/270
181	24/1/3/10/8.5//183/180
182	24/2/1/12/8.5//183/180
183	24/3/1/12/8.5//183/180
184	24/4/1/10/8.5//183/0
185	24/4/2/16/8.5//183/90
186	24/4/3/10/8.5//183/180
187	24/5/1/11/8.25//183/0
188	24/5/2/12/8.25//183/270
189	24/6/1/12/8.25//183/270
190	24/6/2/12/8.25//183/180
191	24/7/1/11/8.25//183/0
192	24/7/2/12/8.25//183/90
193	24/8/1/12/8.25//183/90
194	24/8/2/12/8.25//183/180
195	24/9/1/11/8.5//183/0
196	24/9/2/11/8.5//183/270
197	24/12/1/11/8.5//183/0
198	24/12/2/11/8.5//183/90
199	24/13/1/5/8.5//183/270
200	24/13/2/6/8.5//183/180
201	24/14/1/5/8.5//183/90
202	24/14/2/8/8.5//183/180
203	24/15/1/8/8.25//183/0
204	24/16/1/8/8.25//183/0
205	24/19/1/7/8.25//183/180
206	24/20/1/7/8.25//183/180
207	25/1/1/20/1/1/.81/.64
208	25/1/2/5/2.5/3/.81/.64
209	25/1/3/20/1/1/.81/.64
210	25/2/1/20/1/1/.81/.64
211	25/3/1/20/1/1/.81/.64
212	25/4/1/20/1/1/.81/.64
213	25/4/2/5/2.5/1/.81/.64
214	25/4/3/20/1/1/.81/.64
215	25/5/1/4/2.5/1/.81/.64
216	25/5/2/4/2.5/1/.81/.64
217	25/6/1/4/2.5/1/.81/.64
218	25/6/2/4/2.5/1/.81/.64
219	25/7/1/4/2.5/1/.81/.64
220	25/7/2/4/2.5/1/.81/.64
221	25/8/1/4/2.5/1/.81/.64
222	25/8/2/4/2.5/1/.81/.64
223	25/9/1/5/2.5/1/.81/.64
224	25/9/2/5/2.5/1/.81/.64
225	25/12/1/5/2.5/1/.81/.64
226	25/12/2/5/2.5/1/.81/.64
227	25/13/1/3.5/1/1/.81/.64
228	25/13/2/5/2.5/1/.81/.64
229	25/14/1/3.5/1/1/.81/.64
230	25/14/2/5/2.5/1/.81/.64
231	25/15/1/4/2.5/1/.81/.64
232	25/16/1/4/2.5/1/.81/.64

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LINE #	-----
233	25/19/1/4/2.5/1/.81/.64
234	25/20/1/4/2.5/1/.81/.64
235	26/M/CBLQP/CBLQL/CBLQCLG//OFF/CBLQCLG/OFF/OFF/OFF/OFF
236	27/M/308/SF-PERS/230/190/.5/WATT-SF/INCAND
237	29/1/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF
238	29/2/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF
239	29/3/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF
240	29/4/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF
241	29/5/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF
242	29/6/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF
243	29/7/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF
244	29/8/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF
245	29/9////////.23/CFM-SF
246	29/10////////.23/CFM-SF
247	29/11////////.23/CFM-SF
248	29/12////////.23/CFM-SF
249	29/13////////.23/CFM-SF
250	29/14////////.23/CFM-SF
251	29/15////////.23/CFM-SF
252	29/16////////.23/CFM-SF
253	29/17////////.23/CFM-SF
254	29/18////////.23/CFM-SF
255	29/19////////.23/CFM-SF
256	29/20////////.23/CFM-SF
257	SYSTEM - 2
258	39/2/WALL & ROOF INSULATION
259	40/1/PTAC
260	41/1/1/1
261	42/1/.25
262	45/1/CBLQCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
263	40/2/RAD
264	41/2/1/2
265	45/2/OFF/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF
266	EQUIPMENT - 2
267	59/2/CARLISLE///WALL & ROOF INSULATION
268	60/1/1/PKPLANT/1/1
269	62/1/EQ1161/6
270	65/1/1//2/2
271	67/1/EQ2102/1
272	69/1/EQ4003
273	LOAD - 3
274	19/3/WEATHERSTRIP & CAULKING
275	20/1/1/TV ROOM/160/1/1/0//9.5
276	20/2/1/LIVING ROOM/280/1/1/.75/.45/9.5
277	20/3/1/LIVING ROOM/280/1/1/.75/.45/9.5
278	20/4/1/TV ROOM/160/1/1/0//9.5
279	20/5/1/BEDROOM/156/1/1/0//9
280	20/6/1/BEDROOM/145/1/1/0//9
281	20/7/1/BEDROOM/156/1/1/0//9
282	20/8/1/BEDROOM/145/1/1/0//9
283	20/9/2/DINING ROOM/148/1/1/.75/.45/9.5
284	20/10/2/KITCHEN/108/1/1/.75/.45/9.5
285	20/11/2/KITCHEN/108/1/1/.75/.45/9.5
286	20/12/2/DINING ROOM/148/1/1/.75/.45/9.5
287	20/13/2/REAR FOYER/33/1/2/0//9.5
288	20/14/2/REAR FOYER/33/1/2/0//9.5
289	20/15/2/BEDROOM/80/1/1/0//9
290	20/16/2/BEDROOM/80/1/1/0//9

CONTENTS OF : E:\CB101-14.TM

LINE #	-----
291	20/17/2/HALL/70/1/1/0//9
292	20/18/2/HALL/70/1/1/0//9
293	20/19/2/BATH/53/1/1/0//9
294	20/20/2/BATH/53/1/1/0//9
295	21/M////CBLQTX//CBLQTX
296	22/1/1/YES////171
297	22/4/1/YES////171
298	22/5/1/YES////171
299	22/6/1/YES////171
300	22/7/1/YES////171
301	22/8/1/YES////171
302	22/13/1/YES////171
303	22/14/1/YES////171
304	22/15/1/YES////171
305	22/16/1/YES////171
306	22/17/1/YES////171
307	22/18/1/YES////171
308	22/19/1/YES////171
309	22/20/1/YES////171
310	24/1/1/10/8.5//170/0
311	24/1/2/16/8.5//170/270
312	24/1/3/10/8.5//170/180
313	24/2/1/12/8.5//170/180
314	24/3/1/12/8.5//170/180
315	24/4/1/10/8.5//170/0
316	24/4/2/16/8.5//170/90
317	24/4/3/10/8.5//170/180
318	24/5/1/11/8.25//170/0
319	24/5/2/12/8.25//170/270
320	24/6/1/12/8.25//170/270
321	24/6/2/12/8.25//170/180
322	24/7/1/11/8.25//170/0
323	24/7/2/12/8.25//170/90
324	24/8/1/12/8.25//170/90
325	24/8/2/12/8.25//170/180
326	24/9/1/11/8.5//170/0
327	24/9/2/11/8.5//170/270
328	24/12/1/11/8.5//170/0
329	24/12/2/11/8.5//170/90
330	24/13/1/5/8.5//170/270
331	24/13/2/6/8.5//170/180
332	24/14/1/5/8.5//170/90
333	24/14/2/8/8.5//170/180
334	24/15/1/8/8.25//170/0
335	24/16/1/8/8.25//170/0
336	24/19/1/7/8.25//170/180
337	24/20/1/7/8.25//170/180
338	25/1/1/20/1/1/.81/.64
339	25/1/2/5/2.5/3/.81/.64
340	25/1/3/20/1/1/.81/.64
341	25/2/1/20/1/1/.81/.64
342	25/3/1/20/1/1/.81/.64
343	25/4/1/20/1/1/.81/.64
344	25/4/2/5/2.5/1/.81/.64
345	25/4/3/20/1/1/.81/.64
346	25/5/1/4/2.5/1/.81/.64
347	25/5/2/4/2.5/1/.81/.64
348	25/6/1/4/2.5/1/.81/.64

CONTENTS OF : E:\CB101-14.TM

LINE #	
349	25/6/2/4/2.5/1/.81/.64
350	25/7/1/4/2.5/1/.81/.64
351	25/7/2/4/2.5/1/.81/.64
352	25/8/1/4/2.5/1/.81/.64
353	25/8/2/4/2.5/1/.81/.64
354	25/9/1/5/2.5/1/.81/.64
355	25/9/2/5/2.5/1/.81/.64
356	25/12/1/5/2.5/1/.81/.64
357	25/12/2/5/2.5/1/.81/.64
358	25/13/1/3.5/1/1/.81/.64
359	25/13/2/5/2.5/1/.81/.64
360	25/14/1/3.5/1/1/.81/.64
361	25/14/2/5/2.5/1/.81/.64
362	25/15/1/4/2.5/1/.81/.64
363	25/16/1/4/2.5/1/.81/.64
364	25/19/1/4/2.5/1/.81/.64
365	25/20/1/4/2.5/1/.81/.64
366	26/M/CBLQP/CBLQL/CBLQCLG//OFF/CBLQCLG/OFF/OFF/OFF/OFF
367	27/M/308/SF-PERS/230/190/.5/WATT-SF/INCAND
368	29/1/10/PCT-MCLG///.26/CFM-SF/.26/CFM-SF
369	29/2/10/PCT-MCLG///.26/CFM-SF/.26/CFM-SF
370	29/3/10/PCT-MCLG///.26/CFM-SF/.26/CFM-SF
371	29/4/10/PCT-MCLG///.26/CFM-SF/.26/CFM-SF
372	29/5/10/PCT-MCLG///.26/CFM-SF/.26/CFM-SF
373	29/6/10/PCT-MCLG///.26/CFM-SF/.26/CFM-SF
374	29/7/10/PCT-MCLG///.26/CFM-SF/.26/CFM-SF
375	29/8/10/PCT-MCLG///.26/CFM-SF/.26/CFM-SF
376	29/9////////.26/CFM-SF
377	29/10////////.26/CFM-SF
378	29/11////////.26/CFM-SF
379	29/12////////.26/CFM-SF
380	29/13////////.26/CFM-SF
381	29/14////////.26/CFM-SF
382	29/15////////.26/CFM-SF
383	29/16////////.26/CFM-SF
384	29/17////////.26/CFM-SF
385	29/18////////.26/CFM-SF
386	29/19////////.26/CFM-SF
387	29/20////////.26/CFM-SF
388	SYSTEM - 3
389	39/3/WEATHERSTRIP & CAULKING
390	40/1/PTAC
391	41/1/1/1
392	42/1/.25
393	45/1/CBLQCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
394	40/2/RAD
395	41/2/1/2
396	45/2/OFF/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF
397	EQUIPMENT - 3
398	59/3/CARLISLE///WEATHERSTRIP & CAULKING
399	60/1/1/PKPLANT/1/1
400	62/1/EQ1161/6
401	65/1/1//2/2
402	67/1/EQ2102/1
403	69/1/EQ4003
404	LOAD - 4
405	19/4/COMBINED ECOS
406	20/1/1/TV ROOM/160/1/1/0//9.5

CONTENTS OF : E:\CB101-14.TM

LINE #	
407	20/2/1/LIVING ROOM/280/1/1/.75/.45/9.5
408	20/3/1/LIVING ROOM/280/1/1/.75/.45/9.5
409	20/4/1/TV ROOM/160/1/1/0//9.5
410	20/5/1/BEDROOM/156/1/1/0//9
411	20/6/1/BEDROOM/145/1/1/0//9
412	20/7/1/BEDROOM/156/1/1/0//9
413	20/8/1/BEDROOM/145/1/1/0//9
414	20/9/2/DINING ROOM/148/1/1/.75/.45/9.5
415	20/10/2/KITCHEN/108/1/1/.75/.45/9.5
416	20/11/2/KITCHEN/108/1/1/.75/.45/9.5
417	20/12/2/DINING ROOM/148/1/1/.75/.45/9.5
418	20/13/2/REAR FOYER/33/1/2/0//9.5
419	20/14/2/REAR FOYER/33/1/2/0//9.5
420	20/15/2/BEDROOM/80/1/1/0//9
421	20/16/2/BEDROOM/80/1/1/0//9
422	20/17/2/HALL/70/1/1/0//9
423	20/18/2/HALL/70/1/1/0//9
424	20/19/2/BATH/53/1/1/0//9
425	20/20/2/BATH/53/1/1/0//9
426	21/M////CBLQTX////CBLQTX
427	22/1/1/YES////191
428	22/4/1/YES////191
429	22/5/1/YES////191
430	22/6/1/YES////191
431	22/7/1/YES////191
432	22/8/1/YES////191
433	22/13/1/YES////191
434	22/14/1/YES////191
435	22/15/1/YES////191
436	22/16/1/YES////191
437	22/17/1/YES////191
438	22/18/1/YES////191
439	22/19/1/YES////191
440	22/20/1/YES////191
441	24/1/1/10/8.5//183/0
442	24/1/2/16/8.5//183/270
443	24/1/3/10/8.5//183/180
444	24/2/1/12/8.5//183/180
445	24/3/1/12/8.5//183/180
446	24/4/1/10/8.5//183/0
447	24/4/2/16/8.5//183/90
448	24/4/3/10/8.5//183/180
449	24/5/1/11/8.25//183/0
450	24/5/2/12/8.25//183/270
451	24/6/1/12/8.25//183/270
452	24/6/2/12/8.25//183/180
453	24/7/1/11/8.25//183/0
454	24/7/2/12/8.25//183/90
455	24/8/1/12/8.25//183/90
456	24/8/2/12/8.25//183/180
457	24/9/1/11/8.5//183/0
458	24/9/2/11/8.5//183/270
459	24/12/1/11/8.5//183/0
460	24/12/2/11/8.5//183/90
461	24/13/1/5/8.5//183/270
462	24/13/2/6/8.5//183/180
463	24/14/1/5/8.5//183/90
464	24/14/2/8/8.5//183/180

CONTENTS OF : E:\CB101-14.TM

LINE #	
465	24/15/1/8/8.25//183/0
466	24/16/1/8/8.25//183/0
467	24/19/1/7/8.25//183/180
468	24/20/1/7/8.25//183/180
469	25/1/1/20/1/1/.81/.64
470	25/1/2/5/2.5/3/.81/.64
471	25/1/3/20/1/1/.81/.64
472	25/2/1/20/1/1/.81/.64
473	25/3/1/20/1/1/.81/.64
474	25/4/1/20/1/1/.81/.64
475	25/4/2/5/2.5/1/.81/.64
476	25/4/3/20/1/1/.81/.64
477	25/5/1/4/2.5/1/.81/.64
478	25/5/2/4/2.5/1/.81/.64
479	25/6/1/4/2.5/1/.81/.64
480	25/6/2/4/2.5/1/.81/.64
481	25/7/1/4/2.5/1/.81/.64
482	25/7/2/4/2.5/1/.81/.64
483	25/8/1/4/2.5/1/.81/.64
484	25/8/2/4/2.5/1/.81/.64
485	25/9/1/5/2.5/1/.81/.64
486	25/9/2/5/2.5/1/.81/.64
487	25/12/1/5/2.5/1/.81/.64
488	25/12/2/5/2.5/1/.81/.64
489	25/13/1/3.5/1/1/.81/.64
490	25/13/2/5/2.5/1/.81/.64
491	25/14/1/3.5/1/1/.81/.64
492	25/14/2/5/2.5/1/.81/.64
493	25/15/1/4/2.5/1/.81/.64
494	25/16/1/4/2.5/1/.81/.64
495	25/19/1/4/2.5/1/.81/.64
496	25/20/1/4/2.5/1/.81/.64
497	26/M/CBLQP/CBLQL/CBLQCLG//OFF/CBLQCLG/OFF/OFF/OFF/OFF
498	27/M/308/SF-PERS/230/190/.5/WATT-SF/INCAND
499	29/1/10/PCT-MCLG///.19/CFM-SF/.19/CFM-SF
500	29/2/10/PCT-MCLG///.19/CFM-SF/.19/CFM-SF
501	29/3/10/PCT-MCLG///.19/CFM-SF/.19/CFM-SF
502	29/4/10/PCT-MCLG///.19/CFM-SF/.19/CFM-SF
503	29/5/10/PCT-MCLG///.19/CFM-SF/.19/CFM-SF
504	29/6/10/PCT-MCLG///.19/CFM-SF/.19/CFM-SF
505	29/7/10/PCT-MCLG///.19/CFM-SF/.19/CFM-SF
506	29/8/10/PCT-MCLG///.19/CFM-SF/.19/CFM-SF
507	29/9////////.19/CFM-SF
508	29/10////////.19/CFM-SF
509	29/11////////.19/CFM-SF
510	29/12////////.19/CFM-SF
511	29/13////////.19/CFM-SF
512	29/14////////.19/CFM-SF
513	29/15////////.19/CFM-SF
514	29/16////////.19/CFM-SF
515	29/17////////.19/CFM-SF
516	29/18////////.19/CFM-SF
517	29/19////////.19/CFM-SF
518	29/20////////.19/CFM-SF
519	SYSTEM - 4
520	39/4/COMBINED ECOS
521	40/1/PTAC
522	41/1/1/1

CONTENTS OF : E:\CB101-14.TM

LINE #	-----
523	42/1/.25
524	45/1/CBLQCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
525	40/2/RAD
526	41/2/1/2
527	45/2/OFF/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF
528	EQUIPMENT - 4
529	59/4/CARLISLE///COMBINED ECOS
530	60/1/1/PKPLANT/1/1
531	62/1/EQ1161/6
532	65/1/1//2/2
533	67/1/EQ2102/1
534	69/1/EQ4003

Building 101
(Typical for 102, 103, 104, 105, 106,
107, 108, 109, 110, 111,
112, 113, and 114)

Trace Output File

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*****
*****
**
**          T R A C E    6 0 0    A N A L Y S I S          **
**
**          by              **
**
*****
*****
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDINGS 101-114

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Reflectance: 0.20
Winter Ground Reflectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 10: 3:20 1/ 7/94
Dataset Name: CB101-14 .TM

AIRFLOW - ALTERNATIVE 1
BASE BUILDING

----- S Y S T E M S U M M A R Y -----
(Design Airflow Quantities)

System Number	System Type	Main					Auxil. Supply Airflow (Cfm)	Room Exhaust Airflow (Cfm)
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)		
1	PTAC	171	1,708	1,708	2,154	616	0	0
2	RAD	0	0	0	0	677	0	0
Totals		171	1,708	1,708	2,154	1,293	0	0

CAPACITY - ALTERNATIVE 1
BASE BUILDING

----- S Y S T E M S U M M A R Y -----
(Design Capacity Quantities)

System Number	System Type	Cooling				Heating						
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	PTAC	4.3	0.0	0.0	4.3	-77,491	0	0	0	0	0	-77,491
2	RAD	0.0	0.0	0.0	0.0	-117,101	0	0	0	0	0	-117,101
Totals		4.3	0.0	0.0	4.3	-194,592	0	0	0	0	0	-194,592

The building peaked at hour 16 month 7 with a capacity of 4.3 tons

ENGINEERING CHECKS - ALTERNATIVE 1
BASE BUILDING

----- E N G I N E E R I N G C H E C K S -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	Cooling				Heating		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	PTAC	10.00	1.15	394.9	342.6	35.03	1.15	-52.29	1,482
2	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-47.49	2,466

System 1 Peak PTAC - PACKAGED TERMINAL AIR COND.

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/16 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 * OADB: 91 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads												
Skylite Solr.	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	4,039	0		4,039	7.78	*	3,972	11.04	*	-3,410	-3,410	4.41
Glass Solar	9,125	0		9,125	17.58	*	11,195	31.10	*	0	0	0.00
Glass Cond	2,726	0		2,726	5.25	*	2,404	6.68	*	-13,405	-13,405	17.34
Wall Cond	8,040	93		8,133	15.67	*	8,112	22.54	*	-29,086	-29,459	38.11
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	17,114			17,114	32.97	*	6,782	18.84	*	-31,035	-31,035	40.14
Sub Total==>	41,044	93		41,138	79.25	*	32,465	90.20	*	-76,937	-77,310	100.00
Internal Loads						*			*			
Lights	2,070	0		2,070	3.99	*	2,078	5.77	*	0	0	0.00
People	1,784			1,784	3.44	*	884	2.46	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	3,855	0	0	3,855	7.43	*	2,962	8.23	*	0	0	0.00
Ceiling Load	52	-52		0	0.00	*	565	1.57	*	-524	0	0.00
Outside Air	0	0	0	6,560	12.64	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				364	0.70	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		-7	0	-7	-0.01	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	44,951	35	0	51,910	100.00	*	35,992	100.00	*	-77,461	-77,310	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	-----AREAS----- Gross Total Floor	Glass (sf)	(%)
Main Clg	4.3	51.9	37.7	1,708 76.7 63.7 69.7	55.5 53.4 59.0	1,482		
Aux Clg	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	Part	0	
Opt Vent	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	0	
Totals	4.3	51.9				Roof	922	0 0
						Wall	1,592	250 16

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling 171	Heating 0	-----ENGINEERING CHECKS----- Clg % OA 10.0	-----TEMPERATURES (F)----- Type Clg Htg
Main Htg	-77.5	1,708	68.0	109.7	Vent	446	446	Clg Cfm/Saft 1.15	SADB 55.6 109.7
Aux Htg	0.0	0	0.0	0.0	Infil			Clg Cfm/Ton 394.87	Plenum 75.2 67.2
Preheat	-0.0	1,708	61.4	55.4	Supply	1,708	1,708	Clg Saft/Ton 342.59	Return 75.0 67.8
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft 35.03	Ret/OA 76.6 67.8
Humidif.	0.0	0	0.0	0.0	Return	1,708	1,708	No. People 5	Runarnd 75.0 68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	171	0	Htg % OA 0.0	Fn MtrID 0.0 0.0
Total	-77.5				Rm Exh	0	0	Htg Cfm/SqFt 1.15	Fn BldID 0.0 0.0
					Auxil	0	0	Htg Btuh/SqFt -52.29	Fn Frict 0.1 0.0

```
***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==>      Mo/Hr: 0/ 0      *      Mo/Hr: 0/ 0      *      Mo/Hr: 13/ 1
Outside Air ==>      OADB/WB/HR: 0/ 0/ 0.0      *      OADB: 0      *      OADB: 4
```

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads						*			*			
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	-5.156	-5,156	4.40
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-19,947	-19,947	17.03
Wall Cond	0	0		0	0.00	*	0	0.00	*	-43,846	-44,864	38.31
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-47,134	-47,134	40.25
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-116.082	-117,101	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	-5.342	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkub		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
						*			*			
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-121.425	-117,101	100.00

--AREAS.

	Total Capacity		Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	AREAS	
	(Tons)	(Mbh)			Deg F	Deg F	Grains	Deg F	Deg F	Grains		Floor	Glass (sf)
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	2,466	
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	1,394	0 0
Totals :	0.0	0.0									Wall	2,417	372 15

-----AIRFLOWS (cfm)

--ENGINEERING CHECKS--

--TEMPERATURES (F)---

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type Vent	Cooling 0	Heating 0	Clg % OA Clg Cfm/Sqft	0.0 0.00	Type SADB	Clg 0.0	Htg 68.1
Main Htg	-117.1	0	0.0	0.0	Infil	0	677	Clg Cfm/Ton	0.00	Plenum	0.0	66.3
Aux Htg	0.0	0	0.0	0.0	Supply	0	0	Clg Sqft/Ton	0.00	Return	0.0	68.0
Preheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	68.0
Reheat	0.0	0	0.0	0.0	Return	0	0	No. People	0	Runarnd	0.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/SqFt	0.00	Fn BldTD	0.0	0.0
Total	-117.1				Auxil	0	0	Htg Btuh/SqFt	-47.49	Fn Frict	0.0	0.0

BUILDING U-VALUES - ALTERNATIVE 1
BASE BUILDING

----- B U I L D I N G U - V A L U E S -----												
Room Number	Description	Room U-Values (Btu/hr/sqft/F)									Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
		Part.	ExFlr	Summr Skylt	Wintr Skylt	Roof	Summr Windo	Wintr Windo	Wall	Ceil.		
1	TV ROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	203.7	47.66
2	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.549	45.0	12.23
3	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.549	45.0	12.23
4	TV ROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	224.4	52.22
5	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	158.6	37.76
6	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	177.1	41.83
7	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	158.6	37.76
8	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	177.1	41.83
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.549	131.3	31.54
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.549	131.3	31.54
1	TV ROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	203.7	47.66
2	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.549	45.0	12.23
3	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.549	45.0	12.23
4	TV ROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	224.4	52.22
5	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	158.6	37.76
6	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	177.1	41.83
7	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	158.6	37.76
8	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	177.1	41.83
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.549	131.3	31.54
9	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.549	151.3	35.58
10	KITCHEN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.549	6.2	3.70
11	KITCHEN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.549	6.2	3.70
12	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.549	151.3	35.58
13	REAR FOYER	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	332.9	73.43
14	REAR FOYER	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	401.2	88.44
15	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	107.2	26.46
16	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	107.2	26.46
17	HALL	0.000	0.000	0.000	0.000	0.058	0.000	0.000	0.000	0.000	14.3	6.08
18	HALL	0.000	0.000	0.000	0.000	0.058	0.000	0.000	0.000	0.000	14.3	6.08
19	BATH	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	133.8	32.31
20	BATH	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	133.8	32.31
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.549	105.4	25.59
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.549	120.9	29.17
Building		0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.549	124.8	30.06

BUILDING AREAS - ALTERNATIVE 1
BASE BUILDING

BUILDING AREAS

Room Number	Description	Number of Duplicate		Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Min /Wl (%)	Net Wall Area (sqft)
1	TV ROOM	1	1	160	160	0	0	0	0	160	78	25	228
2	LIVING ROOM	1	1	280	280	0	0	0	0	0	20	20	82
3	LIVING ROOM	1	1	280	280	0	0	0	0	0	20	20	82
4	TV ROOM	1	1	160	160	0	0	0	0	160	53	17	253
5	BEDROOM	1	1	156	156	0	0	0	0	156	20	11	170
6	BEDROOM	1	1	145	145	0	0	0	0	145	20	10	178
7	BEDROOM	1	1	156	156	0	0	0	0	156	20	11	170
8	BEDROOM	1	1	145	145	0	0	0	0	145	20	10	178
Zone	1 Total/Ave.				1,482	0	0	0	0	922	250	16	1,342
System	1 Total/Ave.				1,482	0	0	0	0	922	250	16	1,342
1	TV ROOM	1	1	160	160	0	0	0	0	160	78	25	228
2	LIVING ROOM	1	1	280	280	0	0	0	0	0	20	20	82
3	LIVING ROOM	1	1	280	280	0	0	0	0	0	20	20	82
4	TV ROOM	1	1	160	160	0	0	0	0	160	53	17	253
5	BEDROOM	1	1	156	156	0	0	0	0	156	20	11	170
6	BEDROOM	1	1	145	145	0	0	0	0	145	20	10	178
7	BEDROOM	1	1	156	156	0	0	0	0	156	20	11	170
8	BEDROOM	1	1	145	145	0	0	0	0	145	20	10	178
Zone	1 Total/Ave.				1,482	0	0	0	0	922	250	16	1,342
9	DINING ROOM	1	1	148	148	0	0	0	0	0	25	13	162
10	KITCHEN	1	1	108	108	0	0	0	0	0	0	0	0
11	KITCHEN	1	1	108	108	0	0	0	0	0	0	0	0
12	DINING ROOM	1	1	148	148	0	0	0	0	0	25	13	162
13	REAR FOYER	1	1	33	33	0	0	0	0	33	16	17	78
14	REAR FOYER	1	1	33	33	0	0	0	0	33	16	14	94
15	BEDROOM	1	1	80	80	0	0	0	0	80	10	15	56
16	BEDROOM	1	1	80	80	0	0	0	0	80	10	15	56
17	HALL	1	1	70	70	0	0	0	0	70	0	0	0
18	HALL	1	1	70	70	0	0	0	0	70	0	0	0
19	BATH	1	1	53	53	0	0	0	0	53	10	17	48
20	BATH	1	1	53	53	0	0	0	0	53	10	17	48
Zone	2 Total/Ave.				984	0	0	0	0	472	122	15	703
System	2 Total/Ave.				2,466	0	0	0	0	1,394	372	15	2,045
Building					3,948	0	0	0	0	2,316	622	16	3,387

Trane Air Conditioning Economics
By: Trane Customer Direct Service Network

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ASHRAE 90 ANALYSIS - ALTERNATIVE 1
BASE BUILDING

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.058 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.416 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.285 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTvr) = 3.58 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTvw) = 16.39 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1
BASE BUILDING

SYSTEM LOAD PROFILE

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.2	11	154	-9,730	8	375	85.4	0	0	0.0	0	0
5 - 10	0.4	15	220	-19,459	13	614	170.8	0	0	0.0	0	0
10 - 15	0.6	10	143	-29,189	16	747	256.2	0	0	0.0	0	0
15 - 20	0.9	6	89	-38,918	20	898	341.6	42	1,530	0.0	0	0
20 - 25	1.1	8	118	-48,648	22	993	427.0	0	0	0.0	0	0
25 - 30	1.3	11	154	-58,378	18	830	512.4	0	0	0.0	0	0
30 - 35	1.5	9	134	-68,107	2	94	597.8	0	0	0.0	0	0
35 - 40	1.7	13	191	-77,837	0	0	683.3	0	0	0.0	0	0
40 - 45	1.9	5	66	-87,566	0	0	768.7	0	0	0.0	0	0
45 - 50	2.2	3	42	-97,296	0	0	854.1	21	765	0.0	0	0
50 - 55	2.4	3	42	-107,026	0	0	939.5	0	0	0.0	0	0
55 - 60	2.6	3	40	-116,755	0	0	1,024.9	0	0	0.0	0	0
60 - 65	2.8	0	0	-126,485	0	0	1,110.3	0	0	0.0	0	0
65 - 70	3.0	0	0	-136,215	0	0	1,195.7	0	0	0.0	0	0
70 - 75	3.2	0	0	-145,944	0	0	1,281.1	0	0	0.0	0	0
75 - 80	3.5	0	0	-155,674	0	0	1,366.5	0	0	0.0	0	0
80 - 85	3.7	0	0	-165,403	0	0	1,451.9	0	0	0.0	0	0
85 - 90	3.9	1	20	-175,133	0	0	1,537.3	0	0	0.0	0	0
90 - 95	4.1	1	11	-184,863	0	0	1,622.7	0	0	0.0	0	0
95 - 100	4.3	0	0	-194,592	0	0	1,708.1	38	1,377	0.0	0	0
Hours Off	0.0	0	7,336	0	0	4,209	0.0	0	5,088	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1
 BASE BUILDING

----- B U I L D I N G T E M P E R A T U R E P R O F I L E S -----

Temperature	----- Zone Number -----		
Range	1	1	2
(F)			

Max. Temp.	79.2	92.9	91.8
Mo./Hr.	7 14	8 22	8 23
Day Type	1	1	1

	..... Number of Hours		
Above 100	0	0	0
95 - 100	0	0	0
90 - 95	0	1,164	589
85 - 90	0	1,000	1,332
80 - 85	0	764	1,007
75 - 80	2,898	578	472
70 - 75	837	590	688
65 - 70	471	4,664	4,672
60 - 65	354	0	0
55 - 60	1,362	0	0
50 - 55	478	0	0
Below 50	2,360	0	0

Min. Temp.	37.6	67.9	68.0
Mo./Hr.	2 10	2 8	1 1
Day Type	5	2	1

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1
BASE BUILDING

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	HOT WTR	HOT W DMND
	Off Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	524	2	361	1
Feb	474	2	353	1
March	537	2	231	0
April	505	2	93	0
May	621	2	0	0
June	1,132	9	0	0
July	2,019	9	0	0
Aug	1,233	9	0	0
Sept	592	8	0	0
Oct	529	2	24	0
Nov	505	2	157	0
Dec	518	2	305	1
Total	9,190	9	1,525	1

Building Energy Consumption = 46,563 (Btu/Sq Ft/Year)
Source Energy Consumption = 75,327 (Btu/Sq Ft/Year)

Floor Area = 3,948 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION

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UTILITY PEAK CHECKSUMS - ALTERNATIVE 1
BASE BUILDING

----- UTILITY PEAK CHECKSUMS -----

Utility ELECTRIC DEMAND

Peak Value 9.0 (kW)
Yearly Time of Peak 16 (hr) 7 (mo)

Hour 16 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Percent Of Tot (%)
----------------------	------------------------	-----------------------	---------------------------	--------------------------

Cooling Equipment

1	EQ1161	AIR-CLD COND COMP <15 TONS	6.8	75.71
---	--------	----------------------------	-----	-------

Sub Total			6.8	75.71
-----------	--	--	-----	-------

Sub Total			0.0	0.00
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Air Moving Equipment

1		SUMMATION OF FAN ELECTRICAL DEMAND	0.2	2.43
---	--	------------------------------------	-----	------

Sub Total			0.2	2.43
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Sub Total			0.0	0.00
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Miscellaneous

Lights			2.0	21.86
--------	--	--	-----	-------

Base Utilities			0.0	0.00
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Misc Equipment			0.0	0.00
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Sub Total			2.0	21.86
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Grand Total			9.0	100.00
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**  
**          T R A C E    6 0 0    A N A L Y S I S          **  
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**          by          **  
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDINGS 101-114

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Reflectance: 0.20
Winter Ground Reflectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 10:22:58 1/ 7/94
Dataset Name: CB101-14 .TM

AIRFLOW - ALTERNATIVE 2
WALL & ROOF INSULATION

----- SYSTEM SUMMARY -----
(Design Airflow Quantities)

System Number	System Type	Main					Auxil. Supply Airflow (Cfm)	Room Exhaust Airflow (Cfm)
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)		
1	PTAC	120	1,199	1,199	1,565	486	0	0
2	RAD	0	0	0	0	556	0	0
Totals		120	1,199	1,199	1,565	1,042	0	0

CAPACITY - ALTERNATIVE 2
WALL & ROOF INSULATION

----- SYSTEM SUMMARY -----
(Design Capacity Quantities)

System Number	System Type	Cooling					Heating						
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Sys. Opt. Capacity (Tons)	Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Capacity (Btuh)	Vent Capacity (Btuh)
1	PTAC	3.1	0.0	0.0	0.0	3.1	-45,492	0	0	0	0	0	0
2	RAD	0.0	0.0	0.0	0.0	0.0	-68,640	0	0	0	0	0	0
Totals		3.1	0.0	0.0	0.0	3.1	-114,133	0	0	0	0	0	0

The building peaked at hour 16 month 7 with a capacity of 3.1 tons

ENGINEERING CHECKS - ALTERNATIVE 2
WALL & ROOF INSULATION

----- ENGINEERING CHECKS -----

System Number	Main/Auxiliary	System Type	Percent Outside Air	Cooling				Heating		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	PTAC	10.00	0.81	382.4	472.5	25.40	0.81	-30.70	1,482
2	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-27.83	2,466

System 1 Peak PTAC - PACKAGED TERMINAL AIR COND.

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/16 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	1,644	0		1,644	4.37	*	1,695	6.65	*	-1,582	-1,582	3.48
Glass Solar	9,125	0		9,125	24.24	*	11,195	43.93	*	0	0	0.00
Glass Cond	2,726	0		2,726	7.24	*	2,404	9.43	*	-13,405	-13,405	29.49
Wall Cond	1,354	16		1,369	3.64	*	1,341	5.26	*	-4,913	-4,976	10.95
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	14,058			14,058	37.35	*	5,571	21.86	*	-25,493	-25,493	56.08
Sub Total==>	28,907	16		28,923	76.84	*	22,206	87.13	*	-45,393	-45,457	100.00
Internal Loads												
Lights	2,070	0		2,070	5.50	*	2,078	8.15	*	0	0	0.00
People	1,784			1,784	4.74	*	884	3.47	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	3,855	0	0	3,855	10.24	*	2,962	11.62	*	0	0	0.00
Ceiling Load	10	-10		0	0.00	*	318	1.25	*	-309	0	0.00
Outside Air	0	0	0	4,606	12.24	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				256	0.68	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		-1	0	-1	-0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	32,771	5	0	37,638	100.00	*	25,486	100.00	*	-45,702	-45,457	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	3.1	37.6	1,199	76.6 63.9 71.0	55.4 53.4 59.1	1,482		
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0		
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	3.1	37.6				922	0	0
						1,592	250	16

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	10.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F								
Main Htg	-45.5	1,199	68.2	103.0	Vent	120	0	Clg Cfm/Sqft	0.81	SADB	55.5	103.0
Aux Htg	0.0	0	0.0	0.0	Infil	366	366	Clg Cfm/Ton	382.39	Plenum	75.0	67.8
Preheat	-0.0	1,199	61.6	55.3	Supply	1,199	1,199	Clg Sqft/Ton	472.50	Return	75.0	68.0
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	25.40	Ret/OA	76.6	68.0
Humidif	0.0	0	0.0	0.0	Return	1,199	1,199	No. People	5	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	120	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-45.5				Rm Exh	0	0	Htg Cfm/Sqft	0.81	Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/Sqft	-30.70	Fn Frict	0.1	0.0

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 2 Block RAD - RADIATION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	-2,392	-2,392	3.48
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-19,947	-19,947	29.06
Wall Cond	0	0		0	0.00	*	0	0.00	*	-7,405	-7,584	11.05
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-38,717	-38,717	56.41
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-68,461	-68,640	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	-2,408	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-70,869	-68,640	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total	AREAS Glass (sf) (%)
Main Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Floor	2,466
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Part	0
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	0
Totals	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Roof	1,394 0 0
						Wall	2,417 372 15

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	ENGINEERING CHECKS-- Clg % OA 0.0	TEMPERATURES (F)--- Type Clg Htg
Main Htg	-68.6	0	0.0	0.0	Vent	0	0	Clg Cfm/Sqft 0.00	SADB 0.0 68.1
Aux Htg	0.0	0	0.0	0.0	Infil	0	556	Clg Cfm/Ton 0.00	Plenum 0.0 67.7
Preheat	0.0	0	0.0	0.0	Supply	0	0	Clg Sqft/Ton 0.00	Return 0.0 68.0
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft 0.00	Ret/OA 0.0 68.0
Humidif	0.0	0	0.0	0.0	Return	0	0	No. People 0	Runarnd 0.0 68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA 0.0	Fn MtrTD 0.0 0.0
Total	-68.6				Rm Exh	0	0	Htg Cfm/Sqft 0.00	Fn BldTD 0.0 0.0
					Auxil	0	0	Htg Btuh/Sqft -27.83	Fn Frict 0.0 0.0

BUILDING U-VALUES - ALTERNATIVE 2
WALL & ROOF INSULATION

----- B U I L D I N G U - V A L U E S -----

Room Number	Description	Room U-Values (Btu/hr/sqft/F)									Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
		Part.	ExFlr	Summr Skylt	Wintr Skylt	Roof	Summr Windo	Wintr Windo	Wall	Ceil.		
1	TV ROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	208.2	48.56
2	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.549	45.7	12.37
3	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.549	45.7	12.37
4	TV ROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	229.3	53.18
5	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	162.3	38.49
6	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	181.1	42.62
7	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	162.3	38.49
8	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	181.1	42.62
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.549	134.1	32.10
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.549	134.1	32.10
1	TV ROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	208.2	48.56
2	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.549	45.7	12.37
3	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.549	45.7	12.37
4	TV ROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	229.3	53.18
5	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	162.3	38.49
6	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	181.1	42.62
7	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	162.3	38.49
8	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	181.1	42.62
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.549	134.1	32.10
9	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.549	154.0	36.11
10	KITCHEN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.549	6.2	3.70
11	KITCHEN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.549	6.2	3.70
12	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.549	154.0	36.11
13	REAR FOYER	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	339.6	74.77
14	REAR FOYER	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	409.2	90.02
15	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	109.9	27.00
16	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	109.9	27.00
17	HALL	0.000	0.000	0.000	0.000	0.027	0.000	0.000	0.000	0.000	15.3	6.28
18	HALL	0.000	0.000	0.000	0.000	0.027	0.000	0.000	0.000	0.000	15.3	6.28
19	BATH	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	137.0	32.95
20	BATH	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	137.0	32.95
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.549	107.6	26.03
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.549	123.5	29.68
Building		0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.549	127.5	30.59

BUILDING AREAS - ALTERNATIVE 2
WALL & ROOF INSULATION

----- B U I L D I N G A R E A S -----													
Room Number	Description	Number of Duplicate		Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	TV ROOM	1	1	160	160	0	0	0	0	160	78	25	228
2	LIVING ROOM	1	1	280	280	0	0	0	0	0	20	20	82
3	LIVING ROOM	1	1	280	280	0	0	0	0	0	20	20	82
4	TV ROOM	1	1	160	160	0	0	0	0	160	53	17	253
5	BEDROOM	1	1	156	156	0	0	0	0	156	20	11	170
6	BEDROOM	1	1	145	145	0	0	0	0	145	20	10	178
7	BEDROOM	1	1	156	156	0	0	0	0	156	20	11	170
8	BEDROOM	1	1	145	145	0	0	0	0	145	20	10	178
Zone	1 Total/Ave.				1,482	0	0	0	0	922	250	16	1,342
System	1 Total/Ave.				1,482	0	0	0	0	922	250	16	1,342
1	TV ROOM	1	1	160	160	0	0	0	0	160	78	25	228
2	LIVING ROOM	1	1	280	280	0	0	0	0	0	20	20	82
3	LIVING ROOM	1	1	280	280	0	0	0	0	0	20	20	82
4	TV ROOM	1	1	160	160	0	0	0	0	160	53	17	253
5	BEDROOM	1	1	156	156	0	0	0	0	156	20	11	170
6	BEDROOM	1	1	145	145	0	0	0	0	145	20	10	178
7	BEDROOM	1	1	156	156	0	0	0	0	156	20	11	170
8	BEDROOM	1	1	145	145	0	0	0	0	145	20	10	178
Zone	1 Total/Ave.				1,482	0	0	0	0	922	250	16	1,342
9	DINING ROOM	1	1	148	148	0	0	0	0	0	25	13	162
10	KITCHEN	1	1	108	108	0	0	0	0	0	0	0	0
11	KITCHEN	1	1	108	108	0	0	0	0	0	0	0	0
12	DINING ROOM	1	1	148	148	0	0	0	0	0	25	13	162
13	REAR FOYER	1	1	33	33	0	0	0	0	33	16	17	78
14	REAR FOYER	1	1	33	33	0	0	0	0	33	16	14	94
15	BEDROOM	1	1	80	80	0	0	0	0	80	10	15	56
16	BEDROOM	1	1	80	80	0	0	0	0	80	10	15	56
17	HALL	1	1	70	70	0	0	0	0	70	0	0	0
18	HALL	1	1	70	70	0	0	0	0	70	0	0	0
19	BATH	1	1	53	53	0	0	0	0	53	10	17	48
20	BATH	1	1	53	53	0	0	0	0	53	10	17	48
Zone	2 Total/Ave.				984	0	0	0	0	472	122	15	703
System	2 Total/Ave.				2,466	0	0	0	0	1,394	372	15	2,045
Building					3,948	0	0	0	0	2,316	622	16	3,387

ASHRAE 90 ANALYSIS - ALTERNATIVE 2
WALL & ROOF INSULATION

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.027 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.175 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.121 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 1.35 (Btu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTVw) = 15.01 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2
WALL & ROOF INSULATION

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.2	13	140	-5,707	7	292	60.0	0	0	0.0	0	0
5 - 10	0.3	8	84	-11,413	12	472	119.9	0	0	0.0	0	0
10 - 15	0.5	7	81	-17,120	19	751	179.9	0	0	0.0	0	0
15 - 20	0.6	4	41	-22,827	24	930	239.9	42	1,530	0.0	0	0
20 - 25	0.8	7	79	-28,533	17	685	299.8	0	0	0.0	0	0
25 - 30	0.9	17	188	-34,240	18	692	359.8	0	0	0.0	0	0
30 - 35	1.1	5	58	-39,946	2	94	419.8	0	0	0.0	0	0
35 - 40	1.3	6	72	-45,653	0	0	479.8	0	0	0.0	0	0
40 - 45	1.4	8	94	-51,360	0	0	539.7	0	0	0.0	0	0
45 - 50	1.6	13	143	-57,066	0	0	599.7	21	765	0.0	0	0
50 - 55	1.7	5	54	-62,773	0	0	659.7	0	0	0.0	0	0
55 - 60	1.9	0	0	-68,480	0	0	719.6	0	0	0.0	0	0
60 - 65	2.0	5	51	-74,186	0	0	779.6	0	0	0.0	0	0
65 - 70	2.2	0	0	-79,893	0	0	839.6	0	0	0.0	0	0
70 - 75	2.4	0	0	-85,599	0	0	899.5	0	0	0.0	0	0
75 - 80	2.5	0	0	-91,306	0	0	959.5	0	0	0.0	0	0
80 - 85	2.7	0	0	-97,013	0	0	1,019.5	0	0	0.0	0	0
85 - 90	2.8	0	0	-102,719	0	0	1,079.4	0	0	0.0	0	0
90 - 95	3.0	0	0	-108,426	0	0	1,139.4	0	0	0.0	0	0
95 - 100	3.1	3	31	-114,133	0	0	1,199.4	38	1,377	0.0	0	0
Hours Off	0.0	0	7,644	0	0	4,844	0.0	0	5,088	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2
 WALL & ROOF INSULATION

----- B U I L D I N G T E M P E R A T U R E P R O F I L E S -----

Temperature	----- Zone Number -----		
Range (F)	1	1	2
Max. Temp.	78.8	95.6	94.9
Mo./Hr.	7 14	9 21	9 20
Day Type	1	1	1
	..... Number of Hours		
Above 100	0	0	0
95 - 100	0	307	0
90 - 95	0	1,901	1,983
85 - 90	0	221	370
80 - 85	0	915	995
75 - 80	2,928	379	378
70 - 75	771	693	690
65 - 70	797	4,344	4,344
60 - 65	612	0	0
55 - 60	1,115	0	0
50 - 55	731	0	0
Below 50	1,806	0	0
Min. Temp.	40.5	68.0	67.9
Mo./Hr.	2 11	1 1 11	6
Day Type	5	1	2

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2
WALL & ROOF INSULATION

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	HOT WTR	HOT W DMND
	Off Peak (kWh)	On Peak (kW)	On Peak (Thrm)	On Peak (Thrm/hr)
Jan	523	2	193	0
Feb	473	2	194	0
March	537	2	122	0
April	504	2	38	0
May	593	2	0	0
June	979	7	0	0
July	1,508	7	0	0
Aug	1,066	7	0	0
Sept	566	7	0	0
Oct	529	2	0	0
Nov	504	2	64	0
Dec	517	2	158	0
Total	8,300	7	769	0

Building Energy Consumption = 26,662 (Btu/Sq Ft/Year)
Source Energy Consumption = 47,509 (Btu/Sq Ft/Year)

Floor Area = 3,948 (Sq Ft)

----- EQUIPMENT ENERGY CONSUMPTION -----

Ref Num	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS ELEC PK	522 2.0	472 2.0	535 2.0	503 2.0	529 2.0	516 2.0	516 2.0	535 2.0	503 2.0	529 2.0	503 2.0	516 2.0	6,181 2.0
1	MISC LD ELEC PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
2	MISC LD GAS PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
3	MISC LD OIL PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
4	MISC LD P STEAM PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
5	MISC LD P HOTH2O PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
6	MISC LD P CHILL PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
1	EQ1161 ELEC PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	292 4.0	702 4.3	347 4.2	0 4.1	0 0.0	0 0.0	0 0.0	1,341 4.3
1	EQ5200 ELEC PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	30 0.2	71 0.4	36 0.4	0 0.2	0 0.0	0 0.0	0 0.0	137 0.4
1	EQ5303 ELEC PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	79 0.3	155 0.3	84 0.3	0 0.3	0 0.0	0 0.0	0 0.0	317 0.3
1	EQ4003 ELEC PK	0 0.0	0 0.0	0 0.0	0 0.0	64 0.2	62 0.2	64 0.2	64 0.2	62 0.2	0 0.0	0 0.0	0 0.0	318 0.2
1	EQ2102 P HOTH2O PK	193 0.4	194 0.4	122 0.3	38 0.2	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	64 0.2	158 0.3	769 0.4
1	EQ5020	HEAT WATER CIRC. PUMP C.V.												

V 600
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UTILITY PEAK CHECKSUMS - ALTERNATIVE 2
WALL & ROOF INSULATION

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 7.2 (kW)
Yearly Time of Peak 16 (hr) 7 (mo)

Hour 16 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Percnt Of Tot (%)
----------------------	------------------------	-----------------------	---------------------------	-------------------------

Cooling Equipment

1	EQ1161	AIR-CLD COND COMP <15 TONS	5.0	70.31
---	--------	----------------------------	-----	-------

Sub Total			5.0	70.31
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Sub Total			0.0	0.00
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Air Moving Equipment

1		SUMMATION OF FAN ELECTRICAL DEMAND	0.2	2.15
---	--	------------------------------------	-----	------

Sub Total			0.2	2.15
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Sub Total			0.0	0.00
-----------	--	--	-----	------

Miscellaneous

Lights			2.0	27.54
--------	--	--	-----	-------

Base Utilities			0.0	0.00
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Misc Equipment			0.0	0.00
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Sub Total			2.0	27.54
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Grand Total			7.2	100.00
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**
**          T R A C E    6 0 0    A N A L Y S I S          **
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**          by          **
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDINGS 101-114

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Relectance: 0.20
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 10:42:17 1/ 7/94
Dataset Name: CB101-14 .TM

AIRFLOW - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- S Y S T E M S U M M A R Y -----
(Design Airflow Quantities)

System Number	System Type	Main					Auxil. Supply Airflow (Cfm)	Room Exhaust Airflow (Cfm)
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)		
1	PTAC	171	1,709	1,709	2,123	585	0	0
2	RAD	0	0	0	0	628	0	0
Totals		171	1,709	1,709	2,123	1,213	0	0

CAPACITY - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- S Y S T E M S U M M A R Y -----
(Design Capacity Quantities)

System Number	System Type	Cooling					Heating					
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	PTAC	4.2	0.0	0.0	4.2	-75,277	0	0	0	0	0	-75,277
2	RAD	0.0	0.0	0.0	0.0	-113,735	0	0	0	0	0	-113,735
Totals		4.2	0.0	0.0	4.2	-189,012	0	0	0	0	0	-189,012

The building peaked at hour 16 month 7 with a capacity of 4.2 tons

ENGINEERING CHECKS - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- E N G I N E E R I N G C H E C K S -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	Cooling				Heating		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	PTAC	10.00	1.15	404.6	350.8	34.21	1.15	-50.79	1,482
2	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-46.12	2,466

System 1 Peak PTAC - PACKAGED TERMINAL AIR COND.

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/16 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 * OADB: 91 * OADB: 4

	Space Sens.+Lat. (8tuh)	Ret. Air Sensible (8tuh)	Ret. Air Latent (8tuh)	Net Total (8tuh)	Perct Of Tot (%)	*	Space Sensible (8tuh)	Perct Of Tot (%)	*	Space Peak Space Sens (8tuh)	Coil Peak Tot Sens (8tuh)	Perct Of Tot (%)
Envelope Loads												
Skylite Solr	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	4,039	0	0	4,039	7.97	*	3,972	11.19	*	-3,410	-3,410	4.54
Glass Solar	9,125	0	0	9,125	18.00	*	11,195	31.53	*	0	0	0.00
Glass Cond	2,726	0	0	2,726	5.38	*	2,404	6.77	*	-13,405	-13,405	17.85
Wall Cond	8,040	93	0	8,133	16.04	*	8,112	22.85	*	-29,086	-29,459	39.23
Partition	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	15,892	0	0	15,892	31.35	*	6,297	17.73	*	-28,819	-28,819	38.38
Sub Total==>	39,822	93	0	39,915	78.74	*	31,981	90.06	*	-74,720	-75,093	100.00
Internal Loads						*			*			
Lights	2,070	0	0	2,070	4.08	*	2,078	5.85	*	0	0	0.00
People	1,784	0	0	1,784	3.52	*	884	2.49	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	3,855	0	0	3,855	7.60	*	2,962	8.34	*	0	0	0.00
Ceiling Load	52	-52	0	0	0.00	*	568	1.60	*	-523	0	0.00
Outside Air	0	0	0	6,864	12.95	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				365	0.72	*		0.00	*		0	0.00
Ret. Fan Heat		0	0	0	0.00	*		0.00	*		0	0.00
Duct Heat PkUp		0	0	0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		-7	0	-7	-0.01	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	43,729	34	0	50,692	100.00	*	35,510	100.00	*	-75,244	-75,093	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR			Leaving DB/WB/HR			AREAS		
				Deg F	Deg F	Grains	Deg F	Deg F	Grains	Gross Total	Glass (sf)	(%)
Main Clg	4.2	50.7	1,709	76.7	63.7	69.7	55.8	53.7	59.6	Floor	1,482	
Aux Clg	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	0	
Opt Vent	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0	
Totals	4.2	50.7								Roof	922	0 0
										Wall	1,592	250 16

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	--ENGINEERING CHECKS--		--TEMPERATURES (F)--		
	(Mbh)	(cfm)	Deg F	Deg F	Vent			Clg % OA	10.0	Type	Clg	Htg
Main Htg	-75.3	1,709	68.0	108.5	Infil	414	414	Clg Cfm/Sqft	1.15	SADB	55.9	108.5
Aux Htg	0.0	0	0.0	0.0	Supply	1,709	1,709	Clg Cfm/Ton	404.62	Plenum	75.2	67.2
Preheat	-0.0	1,709	61.4	55.7	Mincfm	0	0	Clg Sqft/Ton	350.82	Return	75.0	67.8
Reheat	0.0	0	0.0	0.0	Return	1,709	1,709	Clg Btuh/Sqft	34.21	Ret/OA	76.6	67.8
Humidif	0.0	0	0.0	0.0	Exhaust	171	0	No. People	5	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-75.3				Auxil	0	0	Htg Cfm/Sqft	1.15	Fn BldTD	0.0	0.0
								Htg Btuh/Sqft	-50.79	Fn Frict	0.1	0.0

System 2 Block RAD - RADIATION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Percent Of Tot (%)	*	Space Sensible (Btuh)	Percent Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Percent Of Tot (%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	-5,156	-5,156	4.53
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-19,947	-19,947	17.54
Wall Cond	0	0		0	0.00	*	0	0.00	*	-43,846	-44,864	39.45
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-43,767	-43,767	38.48
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-112,716	-113,734	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	-5,342	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat PkUp		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-118,058	-113,734	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total Floor	AREAS Glass (sf) (%)
Main Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Part	2,466 0
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	0 0
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Roof	1,394 0 0
Totals	0.0	0.0				Wall	2,417 372 15

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
Main Htg	-113.7	0	0.0	0.0	Vent	0	0	Clg Cfm/Sqft	0.00	SADB	0.0	68.1
Aux Htg	0.0	0	0.0	0.0	Infil	0	628	Clg Cfm/Ton	0.00	Plenum	0.0	66.3
Preheat	0.0	0	0.0	0.0	Supply	0	0	Clg Sft/Ton	0.00	Return	0.0	68.0
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	68.0
Humidif.	0.0	0	0.0	0.0	Return	0	0	No. People	0	Runarnd	0.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-113.7				Rm Exh	0	0	Htg Cfm/Sqft	0.00	Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/Sqft	-46.12	Fn Frict	0.0	0.0

BUILDING U-VALUES - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- B U I L D I N G U - V A L U E S -----

Room Number	Description	Part.	ExFlr	Room U-Values (Btu/hr/sqft/F)							Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
				Summr Skylt	Wintr Skylt	Roof	Summr Windo	Wintr Windo	Wall	Ceill.		
1	TV ROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	203.7	47.66
2	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.549	45.0	12.23
3	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.549	45.0	12.23
4	TV ROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	224.4	52.22
5	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	158.6	37.76
6	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	177.1	41.83
7	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	158.6	37.76
8	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	177.1	41.83
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.549	131.3	31.54
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.549	131.3	31.54
1	TV ROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	203.7	47.66
2	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.549	45.0	12.23
3	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.549	45.0	12.23
4	TV ROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	224.4	52.22
5	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	158.6	37.76
6	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	177.1	41.83
7	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	158.6	37.76
8	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	177.1	41.83
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.549	131.3	31.54
9	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.549	151.3	35.58
10	KITCHEN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.549	6.2	3.70
11	KITCHEN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.549	6.2	3.70
12	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.343	0.549	151.3	35.58
13	REAR FOYER	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	332.9	73.43
14	REAR FOYER	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	401.2	88.44
15	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	107.2	26.46
16	BEDROOM	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	107.2	26.46
17	HALL	0.000	0.000	0.000	0.000	0.058	0.000	0.000	0.000	0.000	14.3	6.08
18	HALL	0.000	0.000	0.000	0.000	0.058	0.000	0.000	0.000	0.000	14.3	6.08
19	BATH	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	133.8	32.31
20	BATH	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.000	133.8	32.31
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.549	105.4	25.59
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.549	120.9	29.17
Building		0.000	0.000	0.000	0.000	0.058	0.810	0.837	0.343	0.549	124.8	30.06

BUILDING AREAS - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- B U I L D I N G A R E A S -----

Room Number	Description	Number of Duplicate		Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
		Flr	Rm										
1	TV ROOM	1	1	160	160	0	0	0	0	160	78	25	228
2	LIVING ROOM	1	1	280	280	0	0	0	0	0	20	20	82
3	LIVING ROOM	1	1	280	280	0	0	0	0	0	20	20	82
4	TV ROOM	1	1	160	160	0	0	0	0	160	53	17	253
5	BEDROOM	1	1	156	156	0	0	0	0	156	20	11	170
6	BEDROOM	1	1	145	145	0	0	0	0	145	20	10	178
7	BEDROOM	1	1	156	156	0	0	0	0	156	20	11	170
8	BEDROOM	1	1	145	145	0	0	0	0	145	20	10	178
Zone	1 Total/Ave.				1,482	0	0	0	0	922	250	16	1,342
System	1 Total/Ave.				1,482	0	0	0	0	922	250	16	1,342
1	TV ROOM	1	1	160	160	0	0	0	0	160	78	25	228
2	LIVING ROOM	1	1	280	280	0	0	0	0	0	20	20	82
3	LIVING ROOM	1	1	280	280	0	0	0	0	0	20	20	82
4	TV ROOM	1	1	160	160	0	0	0	0	160	53	17	253
5	BEDROOM	1	1	156	156	0	0	0	0	156	20	11	170
6	BEDROOM	1	1	145	145	0	0	0	0	145	20	10	178
7	BEDROOM	1	1	156	156	0	0	0	0	156	20	11	170
8	BEDROOM	1	1	145	145	0	0	0	0	145	20	10	178
Zone	1 Total/Ave.				1,482	0	0	0	0	922	250	16	1,342
9	DINING ROOM	1	1	148	148	0	0	0	0	0	25	13	162
10	KITCHEN	1	1	108	108	0	0	0	0	0	0	0	0
11	KITCHEN	1	1	108	108	0	0	0	0	0	0	0	0
12	DINING ROOM	1	1	148	148	0	0	0	0	0	25	13	162
13	REAR FOYER	1	1	33	33	0	0	0	0	33	16	17	78
14	REAR FOYER	1	1	33	33	0	0	0	0	33	16	14	94
15	BEDROOM	1	1	80	80	0	0	0	0	80	10	15	56
16	BEDROOM	1	1	80	80	0	0	0	0	80	10	15	56
17	HALL	1	1	70	70	0	0	0	0	70	0	0	0
18	HALL	1	1	70	70	0	0	0	0	70	0	0	0
19	BATH	1	1	53	53	0	0	0	0	53	10	17	48
20	BATH	1	1	53	53	0	0	0	0	53	10	17	48
Zone	2 Total/Ave.				984	0	0	0	0	472	122	15	703
System	2 Total/Ave.				2,466	0	0	0	0	1,394	372	15	2,045
Building					3,948	0	0	0	0	2,316	622	16	3,387

Trane Air Conditioning Economics
By: Trane Customer Direct Service Network

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ASHRAE 90 ANALYSIS - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.058 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.416 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.285 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.58 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTVw) = 16.39 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.2	8	112	-9,451	9	405	85.5	0	0	0.0	0	0
5 - 10	0.4	13	190	-18,901	13	577	170.9	0	0	0.0	0	0
10 - 15	0.6	13	185	-28,352	16	746	256.4	0	0	0.0	0	0
15 - 20	0.8	5	69	-37,802	20	890	341.8	42	1,530	0.0	0	0
20 - 25	1.1	11	153	-47,253	22	993	427.3	0	0	0.0	0	0
25 - 30	1.3	12	169	-56,704	19	858	512.8	0	0	0.0	0	0
30 - 35	1.5	8	112	-66,154	1	66	598.2	0	0	0.0	0	0
35 - 40	1.7	15	213	-75,605	0	0	683.7	0	0	0.0	0	0
40 - 45	1.9	5	66	-85,055	0	0	769.2	0	0	0.0	0	0
45 - 50	2.1	3	42	-94,506	0	0	854.6	21	765	0.0	0	0
50 - 55	2.3	3	42	-103,957	0	0	940.1	0	0	0.0	0	0
55 - 60	2.5	3	40	-113,407	0	0	1,025.5	0	0	0.0	0	0
60 - 65	2.7	0	0	-122,858	0	0	1,111.0	0	0	0.0	0	0
65 - 70	3.0	0	0	-132,308	0	0	1,196.5	0	0	0.0	0	0
70 - 75	3.2	0	0	-141,759	0	0	1,281.9	0	0	0.0	0	0
75 - 80	3.4	0	0	-151,210	0	0	1,367.4	0	0	0.0	0	0
80 - 85	3.6	0	0	-160,660	0	0	1,452.9	0	0	0.0	0	0
85 - 90	3.8	1	20	-170,111	0	0	1,538.3	0	0	0.0	0	0
90 - 95	4.0	1	11	-179,561	0	0	1,623.8	0	0	0.0	0	0
95 - 100	4.2	0	0	-189,012	0	0	1,709.2	38	1,377	0.0	0	0
Hours Off	0.0	0	7,336	0	0	4,225	0.0	0	5,088	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 3
 WEATHERSTRIP & CAULKING

----- B U I L D I N G T E M P E R A T U R E P R O F I L E S -----

Temperature	----- Zone Number -----		
Range	1	1	2
(F)			
Max. Temp.	79.2	92.9	91.8
Mo./Hr.	7 14	8 22	8 23
Day Type	1	1	1
	..... Number of Hours		
Above 100	0	0	0
95 - 100	0	0	0
90 - 95	0	1,164	589
85 - 90	0	1,000	1,332
80 - 85	0	764	1,007
75 - 80	2,924	595	489
70 - 75	863	577	675
65 - 70	459	4,660	4,668
60 - 65	346	0	0
55 - 60	1,359	0	0
50 - 55	487	0	0
Below 50	2,322	0	0
Min. Temp.	37.9	67.9	67.9
Mo./Hr.	2 10	10 21	1 19
Day Type	5	4	3

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	HOT WTR	HOT W DMND
	Off Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	524	2	350	1
Feb	474	2	341	1
March	537	2	223	0
April	505	2	87	0
May	621	2	0	0
June	1,150	8	0	0
July	2,010	9	0	0
Aug	1,243	9	0	0
Sept	592	8	0	0
Oct	529	2	22	0
Nov	505	2	152	0
Dec	518	2	297	0
Total	9,209	9	1,471	1

Building Energy Consumption = 45,229 (8tu/Sq Ft/Year)
Source Energy Consumption = 73,576 (8tu/Sq Ft/Year)

Floor Area = 3,948 (Sq Ft)

----- EQUIPMENT ENERGY CONSUMPTION

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UTILITY PEAK CHECKSUMS - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- UTILITY PEAK CHECKSUMS -----

Utility ELECTRIC DEMAND

Peak Value 8.9 (kW)
Yearly Time of Peak 16 (hr) 7 (mo)

Hour 16 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Percent Of Tot (%)
----------------------	------------------------	-----------------------	---------------------------	--------------------------

Cooling Equipment

1	EQ1161	AIR-CLD COND COMP <15 TONS	6.7	75.29
Sub Total			6.7	75.29
Sub Total			0.0	0.00

Air Moving Equipment

1		SUMMATION OF FAN ELECTRICAL DEMAND	0.2	2.47
Sub Total			0.2	2.47
Sub Total			0.0	0.00

Miscellaneous

Lights	2.0	22.24
Base Utilities	0.0	0.00
Misc Equipment	0.0	0.00
Sub Total	2.0	22.24

Grand Total	8.9	100.00
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDINGS 101-114

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Reflectance: 0.20
Winter Ground Reflectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 11: 2:22 1/ 7/94
Dataset Name: CB101-14 .TM

AIRFLOW - ALTERNATIVE 4
COMBINED ECOS

----- S Y S T E M S U M M A R Y -----
(Design Airflow Quantities)

System Number	System Type	----- Main -----					Auxil. Supply Airflow (Cfm)	Room Exhaust Airflow (Cfm)
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)		
1	PTAC	115	1,148	1,148	1,451	417	0	0
2	RAD	0	0	0	0	459	0	0
Totals		115	1,148	1,148	1,451	876	0	0

CAPACITY - ALTERNATIVE 4
COMBINED ECOS

----- S Y S T E M S U M M A R Y -----
(Design Capacity Quantities)

System Number	System Type	----- Cooling -----					----- Heating -----						
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Sys. Opt. Capacity (Tons)	Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	PTAC	2.9	0.0	0.0	0.0	2.9	-41,060	0	0	0	0	0	-41,060
2	RAD	0.0	0.0	0.0	0.0	0.0	-61,907	0	0	0	0	0	-61,907
Totals		2.9	0.0	0.0	0.0	2.9	-102,967	0	0	0	0	0	-102,967

The building peaked at hour 16 month 7 with a capacity of 2.9 tons

ENGINEERING CHECKS - ALTERNATIVE 4
COMBINED ECOS

----- E N G I N E E R I N G C H E C K S -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	----- Cooling -----				----- Heating -----		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	PTAC	10.00	0.77	393.8	508.3	23.61	0.77	-27.71	1,482
2	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-25.10	2,466

System 1 Peak PTAC - PACKAGED TERMINAL AIR COND.

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/16 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 * OADB: 91 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Percent Of Tot (%)	*	Space Sensible (Btuh)	Percent Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Percent Of Tot (%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	1,644	0		1,644	4.70	*	1,695	6.91	*	-1,582	-1,582	3.86
Glass Solar	9,125	0		9,125	26.08	*	11,195	45.64	*	0	0	0.00
Glass Cond	2,726	0		2,726	7.79	*	2,404	9.80	*	-13,405	-13,405	32.68
Wall Cond	1,354	16		1,369	3.91	*	1,341	5.47	*	-4,913	-4,976	12.13
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	11,613			11,613	33.19	*	4,602	18.76	*	-21,060	-21,060	51.34
Sub Total==>	26,462	16		26,478	75.68	*	21,237	86.57	*	-40,960	-41,023	100.00
Internal Loads												
Lights	2,070	0		2,070	5.92	*	2,078	8.47	*	0	0	0.00
People	1,784			1,784	5.10	*	884	3.60	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	3,855	0	0	3,855	11.02	*	2,962	12.07	*	0	0	0.00
Ceiling Load	10	-10		0	0.00	*	332	1.35	*	-320	0	0.00
Outside Air	0	0	0	4,410	12.60	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				245	0.70	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		-1	0	-1	-0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	30,326	5	0	34,986	100.00	*	24,532	100.00	*	-41,279	-41,023	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	AREAS Gross Total Floor	Glass (sf)	(%)
Main Clg	2.9	35.0	1,148	76.6 63.7 69.7	55.3 53.4 59.2	1,482		
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0		
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	2.9	35.0				922	0	0
						1,592	250	16

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	Clg % OA	10.0	Type	Clg	Htg
Main Htg	-41.1	1,148	68.2	101.0	Vent	115	0	Clg Cfm/Sqft	0.77	SADB	55.4	101.0
Aux Htg	0.0	0	0.0	0.0	Infil	302	302	Clg Cfm/Ton	393.83	Plenum	75.0	67.8
Preheat	-0.0	1,148	61.6	55.2	Supply	1,148	1,148	Clg Sqft/Ton	508.32	Return	75.0	68.0
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	23.61	Ret/OA	76.6	68.0
Humidif	0.0	0	0.0	0.0	Return	1,148	1,148	No. People	5	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	115	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-41.1				Rm Exh	0	0	Htg Cfm/Sqft	0.77	Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/Sqft	-27.71	Fn Frict	0.1	0.0

System 2 Block RAD - RADIATION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	-2,392	-2,392	3.86
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-19,947	-19,947	32.22
Wall Cond	0	0		0	0.00	*	0	0.00	*	-7,405	-7,584	12.25
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-31,984	-31,984	51.66
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-61,728	-61,907	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	-2,408	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-64,136	-61,907	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total	AREAS Glass (sf) (%)
Main Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Floor	2,466
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Part	0
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	0
Totals	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Roof	1,394 0 0
						Wall	2,417 372 15

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	AIRFLOWS (cfm) Cooling Heating	ENGINEERING CHECKS-- Clg % OA 0.0	TEMPERATURES (F)-- Type Clg Htg
Main Htg	-61.9	0	0.0	0.0	Vent	0	Clg Cfm/Sqft 0.00	SADB 0.0 68.1
Aux Htg	0.0	0	0.0	0.0	Infil	459	Clg Cfm/Ton 0.00	Plenum 0.0 67.7
Preheat	0.0	0	0.0	0.0	Supply	0	Clg Sqft/Ton 0.00	Return 0.0 68.0
Reheat	0.0	0	0.0	0.0	Mincfm	0	Clg Btuh/Sqft 0.00	Ret/OA 0.0 68.0
Humidif	0.0	0	0.0	0.0	Return	0	No. People 0	Runarnd 0.0 68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	Htg % OA 0.0	Fn MtrTD 0.0 0.0
Total	-61.9				Rm Exh	0	Htg Cfm/Sqft 0.00	Fn BldTD 0.0 0.0
					Auxil	0	Htg Btuh/Sqft -25.10	Fn Frict 0.0 0.0

BUILDING U-VALUES - ALTERNATIVE 4
COMBINED ECOS

----- B U I L D I N G U - V A L U E S -----

Room Number	Description	Part.	ExFlr	Room U-Values (Btu/hr/sqft/F)							Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
				Summr Skylt	Wintr Skylt	Roof	Summr Windo	Wintr Windo	Wall	Ceil.		
1	TV ROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	208.2	48.56
2	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.549	45.7	12.37
3	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.549	45.7	12.37
4	TV ROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	229.3	53.18
5	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	162.3	38.49
6	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	181.1	42.62
7	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	162.3	38.49
8	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	181.1	42.62
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.549	134.1	32.10
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.549	134.1	32.10
1	TV ROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	208.2	48.56
2	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.549	45.7	12.37
3	LIVING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.549	45.7	12.37
4	TV ROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	229.3	53.18
5	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	162.3	38.49
6	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	181.1	42.62
7	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	162.3	38.49
8	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	181.1	42.62
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.549	134.1	32.10
9	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.549	154.0	36.11
10	KITCHEN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.549	6.2	3.70
11	KITCHEN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.549	6.2	3.70
12	DINING ROOM	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.058	0.549	154.0	36.11
13	REAR FOYER	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	339.6	74.77
14	REAR FOYER	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	409.2	90.02
15	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	109.9	27.00
16	BEDROOM	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	109.9	27.00
17	HALL	0.000	0.000	0.000	0.000	0.027	0.000	0.000	0.000	0.000	15.3	6.28
18	HALL	0.000	0.000	0.000	0.000	0.027	0.000	0.000	0.000	0.000	15.3	6.28
19	BATH	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	137.0	32.95
20	BATH	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.000	137.0	32.95
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.549	107.6	26.03
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.549	123.5	29.68
Building		0.000	0.000	0.000	0.000	0.027	0.810	0.837	0.058	0.549	127.5	30.59

BUILDING AREAS - ALTERNATIVE 4
COMBINED ECOS

BUILDING AREAS

Room Number	Description	Number of Duplicate Flr Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	TV ROOM	1 1	160	160	0	0	0	0	160	78	25	228
2	LIVING ROOM	1 1	280	280	0	0	0	0	0	20	20	82
3	LIVING ROOM	1 1	280	280	0	0	0	0	0	20	20	82
4	TV ROOM	1 1	160	160	0	0	0	0	160	53	17	253
5	BEDROOM	1 1	156	156	0	0	0	0	156	20	11	170
6	BEDROOM	1 1	145	145	0	0	0	0	145	20	10	178
7	BEDROOM	1 1	156	156	0	0	0	0	156	20	11	170
8	BEDROOM	1 1	145	145	0	0	0	0	145	20	10	178
Zone	1 Total/Ave.			1,482	0	0	0	0	922	250	16	1,342
System	1 Total/Ave.			1,482	0	0	0	0	922	250	16	1,342
1	TV ROOM	1 1	160	160	0	0	0	0	160	78	25	228
2	LIVING ROOM	1 1	280	280	0	0	0	0	0	20	20	82
3	LIVING ROOM	1 1	280	280	0	0	0	0	0	20	20	82
4	TV ROOM	1 1	160	160	0	0	0	0	160	53	17	253
5	BEDROOM	1 1	156	156	0	0	0	0	156	20	11	170
6	BEDROOM	1 1	145	145	0	0	0	0	145	20	10	178
7	BEDROOM	1 1	156	156	0	0	0	0	156	20	11	170
8	BEDROOM	1 1	145	145	0	0	0	0	145	20	10	178
Zone	1 Total/Ave.			1,482	0	0	0	0	922	250	16	1,342
9	DINING ROOM	1 1	148	148	0	0	0	0	0	25	13	162
10	KITCHEN	1 1	108	108	0	0	0	0	0	0	0	0
11	KITCHEN	1 1	108	108	0	0	0	0	0	0	0	0
12	DINING ROOM	1 1	148	148	0	0	0	0	0	25	13	162
13	REAR FOYER	1 1	33	33	0	0	0	0	33	16	17	78
14	REAR FOYER	1 1	33	33	0	0	0	0	33	16	14	94
15	BEDROOM	1 1	80	80	0	0	0	0	80	10	15	56
16	BEDROOM	1 1	80	80	0	0	0	0	80	10	15	56
17	HALL	1 1	70	70	0	0	0	0	70	0	0	0
18	HALL	1 1	70	70	0	0	0	0	70	0	0	0
19	BATH	1 1	53	53	0	0	0	0	53	10	17	48
20	BATH	1 1	53	53	0	0	0	0	53	10	17	48
Zone	2 Total/Ave.			984	0	0	0	0	472	122	15	703
System	2 Total/Ave.			2,466	0	0	0	0	1,394	372	15	2,045
Building				3,948	0	0	0	0	2,316	622	16	3,387

Trane Air Conditioning Economics
By: Trane Customer Direct Service Network

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ASHRAE 90 ANALYSIS - ALTERNATIVE 4
COMBINED ECOS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.027 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.175 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.121 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 1.35 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTVw) = 15.01 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 4
COMBINED ECOS

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.1	9	112	-5,148	7	249	57.4	0	0	0.0	0	0
5 - 10	0.3	7	94	-10,297	12	417	114.8	0	0	0.0	0	0
10 - 15	0.4	11	136	-15,445	18	659	172.2	0	0	0.0	0	0
15 - 20	0.6	5	69	-20,593	26	939	229.6	41	1,519	0.0	0	0
20 - 25	0.7	10	124	-25,742	17	622	287.1	0	11	0.0	0	0
25 - 30	0.9	16	203	-30,890	18	634	344.5	0	0	0.0	0	0
30 - 35	1.0	4	53	-36,039	3	94	401.9	0	0	0.0	0	0
35 - 40	1.2	5	62	-41,187	0	0	459.3	0	0	0.0	0	0
40 - 45	1.3	6	74	-46,335	0	0	516.7	0	0	0.0	0	0
45 - 50	1.5	12	147	-51,484	0	0	574.1	21	765	0.0	0	0
50 - 55	1.6	7	88	-56,632	0	0	631.5	0	0	0.0	0	0
55 - 60	1.7	2	20	-61,780	0	0	688.9	0	0	0.0	0	0
60 - 65	1.9	2	20	-66,929	0	0	746.3	0	0	0.0	0	0
65 - 70	2.0	2	31	-72,077	0	0	803.8	0	0	0.0	0	0
70 - 75	2.2	0	0	-77,225	0	0	861.2	0	0	0.0	0	0
75 - 80	2.3	0	0	-82,374	0	0	918.6	0	0	0.0	0	0
80 - 85	2.5	0	0	-87,522	0	0	976.0	0	0	0.0	0	0
85 - 90	2.6	0	0	-92,670	0	0	1,033.4	0	0	0.0	0	0
90 - 95	2.8	0	0	-97,819	0	0	1,090.8	0	0	0.0	0	0
95 - 100	2.9	2	31	-102,967	0	0	1,148.2	38	1,377	0.0	0	0
Hours Off	0.0	0	7,496	0	0	5,146	0.0	0	5,088	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 4
 COMBINED ECOS

----- B U I L D I N G T E M P E R A T U R E P R O F I L E S -----

Temperature	----- Zone Number -----		
Range	1	1	2
(F)			

Max. Temp.	78.8	95.6	94.9
Mo./Hr.	7 14	9 21	9 20
Day Type	1	1	1

	..... Number of Hours		
Above 100	0	0	0
95 - 100	0	311	0
90 - 95	0	1,897	1,983
85 - 90	0	301	438
80 - 85	0	855	947
75 - 80	3,013	449	443
70 - 75	790	635	653
65 - 70	997	4,312	4,296
60 - 65	472	0	0
55 - 60	1,415	0	0
50 - 55	519	0	0
Below 50	1,554	0	0

Min. Temp.	42.0	67.9	68.0
Mo./Hr.	2 10	3 24	1 1
Day Type	5	1	1

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 4
COMBINED ECOS

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	HOT WTR	HOT W DMND
	Off Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	523	2	171	0
Feb	473	2	170	0
March	536	2	105	0
April	504	2	26	0
May	591	2	0	0
June	1,014	6	0	0
July	1,511	7	0	0
Aug	1,105	7	0	0
Sept	602	6	0	0
Oct	529	2	0	0
Nov	504	2	36	0
Dec	517	2	141	0
Total	8,409	7	649	0

Building Energy Consumption = 23,717 (Btu/Sq Ft/Year)
Source Energy Consumption = 43,741 (Btu/Sq Ft/Year)

Floor Area = 3,948 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION

[illegible]

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[illegible]

UTILITY PEAK CHECKSUMS - ALTERNATIVE 4
COMBINED ECOS

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 6.8 (kW)
Yearly Time of Peak 16 (hr) 7 (mo)

Hour 16 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Percnt Of Tot (%)
----------------------	------------------------	-----------------------	---------------------------	-------------------------

Cooling Equipment

1	EQ1161	AIR-CLD COND COMP <15 TONS	4.7	68.93
Sub Total			4.7	68.93
Sub Total			0.0	0.00

Air Moving Equipment

1		SUMMATION OF FAN ELECTRICAL DEMAND	0.1	2.16
Sub Total			0.1	2.16
Sub Total			0.0	0.00

Miscellaneous

	Lights		2.0	28.91
	Base Utilities		0.0	0.00
	Misc Equipment		0.0	0.00
Sub Total			2.0	28.91

Grand Total			6.8	100.00
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Building 116
Trace Input File

933702

CONTENTS OF : E:\CB116.TM

LINE # -----

1 JOB - 1

2 01/ENERGY SAVINGS OPPORTUNITY STUDY

3 01/CARLISLE BARRACKS, PA

4 01/DEPARTMENT OF THE ARMY

5 01/BENATEC ASSOCIATES

6 01/BUILDING 116

7 08/CARLISLE

8 09/MAY/SEP////APR/OCT

9 10/CLTD-CLF

10 11///ZONE

11 LOAD - 1

12 19/1/BASE BUILDING

13 20/1/1/1ST FL APART'S/27566/1//1

14 20/2/2/2ND FL APART'S/27566/1//1

15 20/3/3/POST NURSERY/2260/1//1

16 20/4/4/POST NURSERY/2849/1//1

17 20/5/5/BASEMENT/22457/1//1

18 21/1////CBLQTX//CBLQTX

19 21/2////CBLQTX//CBLQTX

20 21/3////CBADCTX//CBADHTX

21 21/4////CBADCTX//CBADHTX

22 21/5////CBADCTX//CBADHTX

23 22/2/1/YES////129

24 24/1/1/188/8//170/38

25 24/1/2/596/8//170/128

26 24/1/3/188/8//170/218

27 24/1/4/596/8//170/308

28 24/2/1/188/8//170/38

29 24/2/2/596/8//170/128

30 24/2/3/188/8//170/218

31 24/2/4/596/8//170/308

32 24/3/1/15/8//170/38

33 24/3/2/15/8//170/218

34 24/3/3/86/8//170/308

35 24/4/1/15/8//170/38

36 24/4/2/32/4//170/128

37 24/4/3/70/8//170/218

38 24/4/4/55/8//170/308

39 24/5/1/99/8//170/38

40 24/5/2/455/4//170/128

41 24/5/3/45/8//170/218

42 24/5/4/456/8//170/308

43 25/1/1/6/2.75/12/.52/.57

44 25/1/2/6/2.75/45/.52/.57

45 25/1/3/6/2.75/12/.52/.57

46 25/1/4/6/2.75/73/.52/.57

47 25/2/1/6/2.75/12/.52/.57

48 25/2/2/6/2.75/45/.52/.57

49 25/2/3/6/2.75/12/.52/.57

50 25/2/4/6/2.75/73/.52/.57

51 25/3/3/4.5/2.75/10/.52/.57

52 25/4/2/2.5/2.5/2/.52/.57

53 25/4/3/4.5/2.75/5/.52/.57

54 25/4/4/4.5/2.75/6/.52/.57

55 25/5/1/4.5/2.75/6/.52/.57

56 25/5/2/2.5/2.5/12/.52/.57

57 25/5/4/4.5/2.75/43/.52/.57

58 26/1/CBLQP/CBLQL/OFF//OFF/OFF/OFF/OFF/CBLQL/OFF

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LINE #	
59	26/2/CBLQP/CBLQL/OFF//OFF/OFF/OFF/OFF/CBLQL/OFF
60	26/3/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF
61	26/4/CBADP&L/CBADP&L/OFF//OFF/CBADFAN/OFF/OFF/OFF/OFF
62	26/5/CBADP&L/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF
63	27/1/551/SF-PERS/230/190/.5/WATT-SF/INCAND
64	27/2/551/SF-PERS/230/190/.5/WATT-SF/INCAND
65	27/3/226/SF-PERS/315/325/1.5/WATT-SF
66	27/4/285/SF-PERS/255/255/1.5/WATT-SF
67	27/5/1123/SF-PERS/255/255/1.5/WATT-SF
68	29/1////////.43/CFM-SF
69	29/2////////.43/CFM-SF
70	29/3////////.43/CFM-SF/.43/CFM-SF
71	29/4////////.43/CFM-SF/.43/CFM-SF
72	29/5////////.43/CFM-SF
73	30/1/////////1200/CFM
74	30/2/////////1200/CFM
75	30/3/2500/CFM
76	30/4/2550/CFM/2550/CFM
77	31/4/1/32/4//147/SINE-FIT/80/50
78	31/5/1/455/4//147/SINE-FIT/80/50
79	SYSTEM - 1
80	39/1/BASE BUILDING
81	40/1/SZ
82	41/1/3/3
83	42/1/.36
84	45/1/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
85	40/2/SZ
86	41/2/4/4
87	42/2/.27
88	45/2/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
89	40/3/RAD
90	41/3/1/3/5/5
91	42/3////////.5
92	45/3/OFF/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF
93	EQUIPMENT - 1
94	59/1/CARLISLE///BASE BUILDING
95	60/1/1/PKPLANT/1/1
96	60/2/2/PKPLANT/2/2
97	62/1/EQ1161/1
98	62/2/EQ1161/2
99	65/1/1//2/3
100	67/1/EQ2102/1
101	69/1/EQ4003
102	69/2/EQ4003
103	69/3////////EQ4003
104	LOAD - 2
105	19/2/WEATHERSTRIP & CAULKING
106	20/1/1/1ST FL APART'S/27566/1//1
107	20/2/2/2ND FL APART'S/27566/1//1
108	20/3/3/POST NURSERY/2260/1//1
109	20/4/4/POST NURSERY/2849/1//1
110	20/5/5/BASEMENT/22457/1//1
111	21/1////CBLQTX///CBLQTX
112	21/2////CBLQTX///CBLQTX
113	21/3////CBADCTX///CBADHTX
114	21/4////CBADCTX///CBADHTX
115	21/5////CBADCTX///CBADHTX
116	22/2/1/YES////129

CONTENTS OF : E:\CB116.TM

LINE #	
117	24/1/1/188/8//170/38
118	24/1/2/596/8//170/128
119	24/1/3/188/8//170/218
120	24/1/4/596/8//170/308
121	24/2/1/188/8//170/38
122	24/2/2/596/8//170/128
123	24/2/3/188/8//170/218
124	24/2/4/596/8//170/308
125	24/3/1/15/8//170/38
126	24/3/2/15/8//170/218
127	24/3/3/86/8//170/308
128	24/4/1/15/8//170/38
129	24/4/2/32/4//170/128
130	24/4/3/70/8//170/218
131	24/4/4/55/8//170/308
132	24/5/1/99/8//170/38
133	24/5/2/455/4//170/128
134	24/5/3/45/8//170/218
135	24/5/4/456/8//170/308
136	25/1/1/6/2.75/12/.52/.57
137	25/1/2/6/2.75/45/.52/.57
138	25/1/3/6/2.75/12/.52/.57
139	25/1/4/6/2.75/73/.52/.57
140	25/2/1/6/2.75/12/.52/.57
141	25/2/2/6/2.75/45/.52/.57
142	25/2/3/6/2.75/12/.52/.57
143	25/2/4/6/2.75/73/.52/.57
144	25/3/3/4.5/2.75/10/.52/.57
145	25/4/2/2.5/2.5/2/.52/.57
146	25/4/3/4.5/2.75/5/.52/.57
147	25/4/4/4.5/2.75/6/.52/.57
148	25/5/1/4.5/2.75/6/.52/.57
149	25/5/2/2.5/2.5/12/.52/.57
150	25/5/4/4.5/2.75/43/.52/.57
151	26/1/CBLQP/CBLQL/OFF//OFF/OFF/OFF/OFF/CBLQL/OFF
152	26/2/CBLQP/CBLQL/OFF//OFF/OFF/OFF/OFF/CBLQL/OFF
153	26/3/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF
154	26/4/CBADP&L/CBADP&L/OFF//OFF/CBADFAN/OFF/OFF/OFF/OFF
155	26/5/CBADP&L/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF
156	27/1/551/SF-PERS/230/190/.5/WATT-SF/INCAND
157	27/2/551/SF-PERS/230/190/.5/WATT-SF/INCAND
158	27/3/226/SF-PERS/315/325/1.5/WATT-SF
159	27/4/285/SF-PERS/255/255/1.5/WATT-SF
160	27/5/1123/SF-PERS/255/255/1.5/WATT-SF
161	29/1////////.38/CFM-SF
162	29/2////////.38/CFM-SF
163	29/3////////.38/CFM-SF/.38/CFM-SF
164	29/4////////.38/CFM-SF/.38/CFM-SF
165	29/5////////.38/CFM-SF
166	30/1/////////1200/CFM
167	30/2/////////1200/CFM
168	30/3/2500/CFM
169	30/4/2550/CFM/2550/CFM
170	31/4/1/32/4//147/SINE-FIT/80/50
171	31/5/1/455/4//147/SINE-FIT/80/50
172	SYSTEM - 2
173	39/2/WEATHERSTRIP & CAULKING
174	40/1/SZ

CONTENTS OF : E:\CB116.TM

LINE #	-----
175	41/1/3/3
176	42/1/.36
177	45/1/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
178	40/2/SZ
179	41/2/4/4
180	42/2/.27
181	45/2/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
182	40/3/RAD
183	41/3/1/3/5/5
184	42/3////////.5
185	45/3/OFF/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF
186	EQUIPMENT - 2
187	59/2/CARLISLE///WEATHERSTRIP & CAULKING
188	60/1/1/PKPLANT/1/1
189	60/2/2/PKPLANT/2/2
190	62/1/EQ1161/1
191	62/2/EQ1161/2
192	65/1/1//2/3
193	67/1/EQ2102/1
194	69/1/EQ4003
195	69/2/EQ4003
196	69/3////////EQ4003

Building 116
Trace Output File

933702

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*****  
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**  
**          TRACE 600 ANALYSIS          **  
**  
**          by          **  
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 116

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Relectance: 0.20
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 9:53:30 1/21/94
Dataset Name: CB116 .TM

AIRFLOW - ALTERNATIVE 1
BASE BUILDING

----- S Y S T E M S U M M A R Y -----
(Design Airflow Quantities)

System Number	System Type	Main					Auxil. Supply	Room Exhaust
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Airflow (Cfm)	Airflow (Cfm)
1	SZ	0	2,500	2,500	2,899	399	0	0
2	SZ	0	2,550	2,550	3,087	537	0	0
3	RAD	0	0	0	0	14,033	0	0
Totals		0	5,050	5,050	5,986	14,969	0	0

CAPACITY - ALTERNATIVE 1
BASE BUILDING

----- S Y S T E M S U M M A R Y -----
(Design Capacity Quantities)

System Number	System Type	Cooling					Heating						
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Opt. Capacity (Tons)	Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Capacity (Btuh)	Vent Capacity (Btuh)
1	SZ	2.9	0.0	0.0	0.0	2.9	-49,645	0	0	0	0	0	0
2	SZ	3.8	0.0	0.0	0.0	3.8	-66,875	0	0	0	0	0	0
3	RAD	0.0	0.0	0.0	0.0	0.0	-1,921,006	0	0	0	0	0	0
Totals		6.7	0.0	0.0	0.0	6.7	-2,037,526	0	0	0	0	0	0

The building peaked at hour 16 month 7 with a capacity of 6.7 tons

ENGINEERING CHECKS - ALTERNATIVE 1
BASE BUILDING

----- E N G I N E E R I N G C H E C K S -----

System Number	Main/Auxiliary	System Type	Percent Outside Air	Cooling				Heating		Floor Area Sq Ft
				Cfm/Sq Ft	Cfm/Ton	Sq Ft/Ton	Btuh/Sq Ft	Cfm/Sq Ft	Btuh/Sq Ft	
1	Main	SZ	0.00	1.11	847.5	766.2	15.66	1.11	-21.97	2,260
2	Main	SZ	0.00	0.90	678.0	757.5	15.84	0.90	-23.47	2,849
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-24.06	79,849

System 1 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/16 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 * OADB: 91 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads						*			*			
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Solar	4,331	0		4,331	12.24	*	4,331	15.38	*	0	0	0.00
Glass Cond	882	0		882	2.49	*	882	3.13	*	-4,208	-4,208	8.48
Wall Cond	3,882	502		4,384	12.38	*	3,882	13.79	*	-15,626	-17,645	35.54
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	9,612			9,612	27.15	*	6,731	23.90	*	-27,791	-27,791	55.98
Sub Total==>	18,707	502		19,209	54.27	*	15,826	56.20	*	-47,626	-49,645	100.00
Internal Loads						*			*			
Lights	9,487	0		9,487	26.80	*	9,487	33.69	*	0	0	0.00
People	5,990			5,990	16.92	*	2,740	9.73	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	15,478	0	0	15,478	43.73	*	12,228	43.43	*	0	0	0.00
Ceiling Load	105	-105		0	0.00	*	105	0.37	*	-421	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				711	2.01	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	34,289	397	0	35,398	100.00	*	28,158	100.00	*	-48,046	-49,645	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total Floor	Glass (sf) (%)
Main Clg	2.9	35.4	2,500	75.1 66.7 87.4	64.4 62.5 84.0	2,260	
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0	
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0	
Totals	2.9	35.4				928	124 13

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
Main Htg	-49.6	2,500	67.4	85.7	Vent	0	0	Clg Cfm/Sqft	1.11	SADB	64.6	85.7
Aux Htg	0.0	0	0.0	0.0	Infil	399	399	Clg Cfm/Ton	847.52	Plenum	75.1	67.4
Preheat	-0.0	2,500	67.4	64.4	Supply	2,500	2,500	Clg Sqft/Ton	766.15	Return	75.1	67.4
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	15.66	Ret/OA	75.1	67.4
Humidif	0.0	0	0.0	0.0	Return	2,500	2,500	No. People	10	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.1	0.0
Total	-49.6				Rm Exh	0	0	Htg Cfm/Sqft	1.11	Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/Sqft	-21.97	Fn Frict	0.1	0.0

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 2 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/16 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Solar	5,945	0		5,945	13.17	*	5,945	16.57	*	0	0	0.00
Glass Cond	1,051	0		1,051	2.33	*	1,051	2.93	*	-5,054	-5,054	7.56
Wall Cond	5,753	728		6,481	14.36	*	5,753	16.03	*	-21,405	-24,114	36.06
Partition	92			92	0.20	*	92	0.26	*	-331	-331	0.50
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	14,663			14,663	32.49	*	9,052	25.23	*	-37,375	-37,375	55.89
Sub Total==>	27,504	728		28,232	62.55	*	21,892	61.01	*	-64,165	-66,875	100.00
Internal Loads												
Lights	11,668	0		11,668	25.85	*	11,668	32.52	*	0	0	0.00
People	4,690			4,690	10.39	*	2,141	5.97	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	16,359	0	0	16,359	36.24	*	13,810	38.49	*	0	0	0.00
Ceiling Load	179	-179		0	0.00	*	179	0.50	*	-665	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				544	1.21	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	44,042	549	0	45,135	100.00	*	35,881	100.00	*	-64,830	-66,875	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			AREAS		
	(Tons)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Gross Total	Glass (sf)	(%)
Main Clg	3.8	45.1	37.0	75.2	65.8	82.7	61.9	60.4	78.2	Floor	2,849	
Aux Clg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Part	128	
Opt Vent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0	
Totals	3.8	45.1	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	0	0
										Wall	1,248	149 12

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	--ENGINEERING CHECKS--			--TEMPERATURES (F)---		
	(Mbh)	(cfm)	Deg F	Deg F				Clg % OA	0.0	Type	Clg	Htg	
Main Htg	-66.9	2,550	67.3	91.4	Vent	0	0	Clg Cfm/Sqft	0.90	SADB	62.1	91.4	
Aux Htg	0.0	0	0.0	0.0	Infil	537	537	Clg Cfm/Ton	677.97	Plenum	75.2	67.3	
Preheat	-0.0	2,550	67.3	61.9	Supply	2,550	2,550	Clg Sqft/Ton	757.46	Return	75.2	67.3	
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	15.84	Ret/OA	75.2	67.3	
Humidif	0.0	0	0.0	0.0	Return	2,550	2,550	No. People	10	Runarnd	75.0	68.0	
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0	
Total	-66.9				Rm Exh	0	0	Htg Cfm/Sqft	0.90	Fn BldTD	0.0	0.0	
					Auxil	0	0	Htg Btuh/Sqft	-23.47	Fn Frict	0.1	0.0	

System 3 Block RAD - RADIATION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads						*			*			
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	-170,485	8.87
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-186,742	-186,742	9.72
Wall Cond	0	0		0	0.00	*	0	0.00	*	-524,509	-581,696	30.28
Partition	0			0	0.00	*	0	0.00	*	-4,712	-4,712	0.25
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-977,370	-977,370	50.88
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-1,693,333	-1,921,006	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	-273,486	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-1,966,819	-1,921,006	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F	Entering DB/WB/HR Deg F	Entering DB/WB/HR Grains	Leaving DB/WB/HR Deg F	Leaving DB/WB/HR Deg F	Leaving DB/WB/HR Grains	Gross Total Floor	Glass (sf)	(%)
Main Clg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	79,849		
Aux Clg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,820		
Opt Vent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0		
Totals	0.0	0.0								27,566	0	0
										32,636	5,491	17

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type Vent	AIRFLOWS (cfm) Cooling	Heating	ENGINEERING CHECKS Clg % OA	0.0	TEMPERATURES (F) Type	Clg	Htg
Main Htg	-1,921.0	0	0.0	0.0	Infil	0	0	Clg Cfm/Sqft	0.00	SADB	0.0	68.1
Aux Htg	0.0	0	0.0	0.0	Supply	0	0	Clg Cfm/Ton	0.00	Plenum	0.0	56.2
Preheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Sqft/Ton	0.00	Return	0.0	66.0
Reheat	0.0	0	0.0	0.0	Return	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	66.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	No. People	0	Runarnd	0.0	68.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-1,921.0				Auxil	0	0	Htg Cfm/Sqft	0.00	Fn BldTD	0.0	0.0
								Htg Btuh/Sqft	-24.06	Fn Frict	0.0	0.0

BUILDING U-VALUES - ALTERNATIVE 1
BASE BUILDING

----- B U I L D I N G U - V A L U E S -----												
Room Number	Description	Part.	ExFlr	Room U-Values (Btu/hr/sqft/F)							Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
				Summr Skylt	Wintr Skylt	Roof	Summr Windo	Wintr Windo	Wall	Ceil.		
3	POST NURSERY	0.000	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	60.5	13.03
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	60.5	13.03
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	60.5	13.03
4	POST NURSERY	0.144	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	75.2	16.49
Zone	4 Total/Ave.	0.144	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	75.2	16.49
System	2 Total/Ave.	0.144	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	75.2	16.49
1	1ST FL APART'S	0.000	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	62.4	13.44
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	62.4	13.44
2	2ND FL APART'S	0.000	0.000	0.000	0.000	0.146	0.520	0.531	0.343	0.317	81.2	17.94
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.146	0.520	0.531	0.343	0.317	81.2	17.94
3	POST NURSERY	0.000	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	60.5	13.03
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	60.5	13.03
5	BASEMENT	0.144	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	67.7	15.04
Zone	5 Total/Ave.	0.144	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	67.7	15.04
System	3 Total/Ave.	0.144	0.000	0.000	0.000	0.146	0.520	0.531	0.343	0.317	70.3	15.43
Building		0.144	0.000	0.000	0.000	0.146	0.520	0.531	0.343	0.317	70.2	15.40

BUILDING AREAS - ALTERNATIVE 1
BASE BUILDING

----- B U I L D I N G A R E A S -----													
Room Number	Description	Number of Duplicate Flr	Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
3	POST NURSERY	1	1	2,260	2,260	0	0	0	0	0	124	13	804
Zone	3 Total/Ave.				2,260	0	0	0	0	0	124	13	804
System	1 Total/Ave.				2,260	0	0	0	0	0	124	13	804
4	POST NURSERY	1	1	2,849	2,849	128	0	0	0	0	149	12	1,099
Zone	4 Total/Ave.				2,849	128	0	0	0	0	149	12	1,099
System	2 Total/Ave.				2,849	128	0	0	0	0	149	12	1,099
1	1ST FL APART'S	1	1	27,566	27,566	0	0	0	0	0	2,343	19	10,201
Zone	1 Total/Ave.				27,566	0	0	0	0	0	2,343	19	10,201
2	2ND FL APART'S	1	1	27,566	27,566	0	0	0	0	27,566	2,343	19	10,201
Zone	2 Total/Ave.				27,566	0	0	0	0	27,566	2,343	19	10,201
3	POST NURSERY	1	1	2,260	2,260	0	0	0	0	0	124	13	804
Zone	3 Total/Ave.				2,260	0	0	0	0	0	124	13	804
5	BASEMENT	1	1	22,457	22,457	1,820	0	0	0	0	681	10	5,939
Zone	5 Total/Ave.				22,457	1,820	0	0	0	0	681	10	5,939
System	3 Total/Ave.				79,849	1,820	0	0	0	27,566	5,491	17	27,145
Building					84,958	1,948	0	0	0	27,566	5,764	17	29,048

ASHRAE 90 ANALYSIS - ALTERNATIVE 1
BASE BUILDING

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.146 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.372 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.272 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 10.03 (Btu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTVw) = 15.06 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1
BASE BUILDING

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.3	4	32	-101,876	7	290	252.5	0	0	0.0	0	0
5 - 10	0.7	2	16	-203,753	9	405	505.0	0	0	0.0	0	0
10 - 15	1.0	3	20	-305,629	11	505	757.5	0	0	0.0	0	0
15 - 20	1.3	4	30	-407,505	10	430	1,010.0	0	0	0.0	0	0
20 - 25	1.7	15	113	-509,381	12	554	1,262.5	0	0	0.0	0	0
25 - 30	2.0	7	57	-611,258	13	575	1,515.0	0	0	0.0	0	0
30 - 35	2.3	4	32	-713,134	10	462	1,767.5	0	0	0.0	0	0
35 - 40	2.7	6	45	-815,010	10	464	2,020.0	0	0	0.0	0	0
40 - 45	3.0	3	22	-916,887	4	177	2,272.5	0	0	0.0	0	0
45 - 50	3.4	3	23	-1,018,763	3	119	2,525.0	0	0	0.0	0	0
50 - 55	3.7	6	45	-1,120,639	4	176	2,777.5	58	1,450	0.0	0	0
55 - 60	4.0	8	60	-1,222,516	3	114	3,030.0	0	0	0.0	0	0
60 - 65	4.4	1	4	-1,324,392	4	175	3,282.5	0	0	0.0	0	0
65 - 70	4.7	2	15	-1,426,268	0	0	3,535.0	0	0	0.0	0	0
70 - 75	5.0	5	35	-1,528,145	0	0	3,787.5	0	0	0.0	0	0
75 - 80	5.4	2	15	-1,630,021	0	0	4,040.0	0	0	0.0	0	0
80 - 85	5.7	0	0	-1,731,897	0	0	4,292.5	0	0	0.0	0	0
85 - 90	6.0	4	29	-1,833,774	0	0	4,545.0	0	0	0.0	0	0
90 - 95	6.4	1	4	-1,935,650	0	0	4,797.5	0	0	0.0	0	0
95 - 100	6.7	22	165	-2,037,526	0	0	5,050.0	42	1,070	0.0	0	0
Hours Off	0.0	0	7,998	0	0	4,314	0.0	0	6,240	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1
BASE BUILDING

----- BUILDING TEMPERATURE PROFILES -----

Temperature Range (F)	Zone Number					
	3	4	1	2	3	5

Max. Temp.	82.6	82.3	98.7	98.1	100.6	98.3
Mo./Hr.	7 1	7 24	8 23	8 23	8 20	8 16
Day Type	5	4	1	1	1	2

	Number of Hours					
Above 100	0	0	0	0	396	0
95 - 100	0	0	1,304	1,216	912	842
90 - 95	0	0	837	590	1,280	1,190
85 - 90	0	0	787	966	308	896
80 - 85	575	403	232	352	330	173
75 - 80	2,339	2,673	580	582	531	861
70 - 75	860	1,032	352	374	351	269
65 - 70	366	2,262	4,668	4,680	2,057	2,370
60 - 65	483	1,238	0	0	1,264	1,194
55 - 60	1,031	509	0	0	556	541
50 - 55	661	360	0	0	775	424
Below 50	2,445	283	0	0	0	0

Min. Temp.	33.9	43.9	67.9	67.9	54.9	54.9
Mo./Hr.	2 7	2 7	4 4	3 21	1 14	1 4
Day Type	5	5	2	1	3	4

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1
BASE BUILDING

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	HOT WTR On Peak (Therm)	HOT W DMND On Peak (Thrm/hr)
Jan	15,993	73	5,844	12
Feb	14,462	73	5,705	13
March	17,001	73	3,559	10
April	15,306	73	1,086	8
May	16,557	73	0	0
June	17,402	83	0	0
July	17,249	84	0	0
Aug	18,140	83	0	0
Sept	15,590	83	0	0
Oct	16,473	73	398	5
Nov	15,315	73	2,554	9
Dec	15,490	73	4,846	12
Total	194,976	84	23,992	13

Building Energy Consumption = 36,073 (Btu/Sq Ft/Year)
Source Energy Consumption = 61,154 (Btu/Sq Ft/Year)

Floor Area = 84,958 (Sq Ft)

----- EQUIPMENT ENERGY CONSUMPTION -----

Ref	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	15891	14369	16891	15217	16391	16217	15390	16891	15217	16391	15217	15390	189,471
	PK	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3
1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH2O	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1161		AIR-CLD COND COMP <15 TONS											
	ELEC	0	0	0	0	0	370	630	358	51	0	0	0	1,410
	PK	0.0	0.0	0.0	0.0	0.0	4.0	4.1	4.0	3.8	0.0	0.0	0.0	4.1
1	EQ5200		CONDENSER FANS											
	ELEC	0	0	0	0	0	31	62	31	5	0	0	0	130
	PK	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.3	0.2	0.0	0.0	0.0	0.4
1	EQ5303		CONTROLS											
	ELEC	0	0	0	0	0	66	60	69	14	0	0	0	209
	PK	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
2	EQ1161		AIR-CLD COND COMP <15 TONS											
	ELEC	0	0	0	0	0	447	816	504	107	0	0	0	1,874
	PK	0.0	0.0	0.0	0.0	0.0	5.0	5.2	5.1	4.9	0.0	0.0	0.0	5.2
2	EQ5200		CONDENSER FANS											
	ELEC	0	0	0	0	0	38	80	43	11	0	0	0	171
	PK	0.0	0.0	0.0	0.0	0.0	0.4	0.5	0.4	0.3	0.0	0.0	0.0	0.5
2	EQ5303		CONTROLS											

[illegible]

UTILITY PEAK CHECKSUMS - ALTERNATIVE 1
BASE BUILDING

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 83.8 (kW)
Yearly Time of Peak 16 (hr) 7 (mo)

Hour 16 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Percent Of Tot (%)
Cooling Equipment				
1	EQ1161	AIR-CLD COND COMP <15 TONS	4.7	5.66
2	EQ1161	AIR-CLD COND COMP <15 TONS	6.0	7.12
Sub Total			10.7	12.78
Sub Total			0.0	0.00
Air Moving Equipment				
1		SUMMATION OF FAN ELECTRICAL DEMAND	0.4	0.51
2		SUMMATION OF FAN ELECTRICAL DEMAND	0.3	0.39
Sub Total			0.8	0.90
Sub Total			0.0	0.00
Miscellaneous				
	Lights		72.3	86.32
	Base Utilities		0.0	0.00
	Misc Equipment		0.0	0.00
Sub Total			72.3	86.32
Grand Total			83.8	100.00

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**          TRACE  600  ANALYSIS          **  
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 116

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Relectance: 0.20
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 10:15:27 1/21/94
Dataset Name: CB116 .TM

AIRFLOW - ALTERNATIVE 2
WEATHERSTRIP & CAULKING

----- S Y S T E M S U M M A R Y -----
(Design Airflow Quantities)

System Number	System Type	----- Main -----					Auxil. Supply Airflow (Cfm)	Room Exhaust Airflow (Cfm)
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)		
1	SZ	0	2,500	2,500	2,853	353	0	0
2	SZ	0	2,550	2,550	3,024	474	0	0
3	RAD	0	0	0	0	12,402	0	0
Totals		0	5,050	5,050	5,877	13,229	0	0

CAPACITY - ALTERNATIVE 2
WEATHERSTRIP & CAULKING

----- S Y S T E M S U M M A R Y -----
(Design Capacity Quantities)

System Number	System Type	----- Cooling -----					----- Heating -----						
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Sys. Opt. Capacity (Tons)	Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	SZ	2.9	0.0	0.0	0.0	2.9	-46,413	0	0	0	0	0	-46,413
2	SZ	3.6	0.0	0.0	0.0	3.6	-62,529	0	0	0	0	0	-62,529
3	RAD	0.0	0.0	0.0	0.0	0.0	-1,807,358	0	0	0	0	0	-1,807,358
Totals		6.5	0.0	0.0	0.0	6.5	-1,916,300	0	0	0	0	0	-1,916,300

The building peaked at hour 16 month 7 with a capacity of 6.5 tons

ENGINEERING CHECKS - ALTERNATIVE 2
WEATHERSTRIP & CAULKING

----- E N G I N E E R I N G C H E C K S -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	----- Cooling -----				----- Heating -----		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	SZ	0.00	1.11	874.5	790.5	15.18	1.11	-20.54	2,260
2	Main	SZ	0.00	0.90	702.2	784.6	15.30	0.90	-21.95	2,849
3	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-22.63	79,849

System 1 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==> Mo/Hr: 7/16 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 * OADB: 91 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)		Space Sensible (Btuh)	Perct Of Tot (%)		Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Solar	4,331	0		4,331	12.62	*	4,331	15.82	*	0	0	0.00
Glass Cond	882	0		882	2.57	*	882	3.22	*	-4,208	-4,208	9.07
Wall Cond	3,882	502		4,384	12.78	*	3,882	14.18	*	-15,626	-17,645	38.02
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	8,522			8,522	24.84	*	5,948	21.73	*	-24,560	-24,560	52.92
Sub Total==>	17,616	502		18,118	52.81	*	15,043	54.95	*	-44,394	-46,413	100.00
Internal Loads												
Lights	9,487	0		9,487	27.65	*	9,487	34.66	*	0	0	0.00
People	5,990			5,990	17.46	*	2,740	10.01	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	15,478	0	0	15,478	45.12	*	12,228	44.67	*	0	0	0.00
Ceiling Load	105	-105		0	0.00	*	105	0.38	*	-421	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				711	2.07	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	33,199	397	0	34,307	100.00	*	27,375	100.00	*	-44,815	-46,413	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	AREAS Gross Total Floor	Glass (sf)	(%)
Main Clg	2.9	34.3	2,500	75.1 66.7 87.3	64.7 62.6 84.0	2,260		
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0		
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	2.9	34.3				928	124	13

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	ENGINEERING CHECKS-- Clg % OA	TEMPERATURES (F)--- Type	Clg	Htg
Main Htg	-46.4	2,500	67.4	84.5	Vent	0	0	0.0	SADB	64.9	84.5
Aux Htg	0.0	0	0.0	0.0	Infil	353	353	1.11	Plenum	75.1	67.4
Preheat	-0.0	2,500	67.4	64.7	Supply	2,500	2,500	874.45	Return	75.1	67.4
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	790.50	Ret/OA	75.1	67.4
Humidif	0.0	0	0.0	0.0	Return	2,500	2,500	15.18	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	10	Fn MtrTD	0.1	0.0
Total	-46.4				Rm Exh	0	0	0.0	Fn BldTD	0.0	0.0
					Auxil	0	0	1.11	Fn Frict	0.1	0.0
								-20.54			

System 2 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/16 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Solar	5,945	0		5,945	13.64	*	5,945	17.07	*	0	0	0.00
Glass Cond	1,051	0		1,051	2.41	*	1,051	3.02	*	-5,054	-5,054	8.08
Wall Cond	5,753	728		6,481	14.87	*	5,753	16.52	*	-21,405	-24,114	38.56
Partition	92			92	0.21	*	92	0.26	*	-331	-331	0.53
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	13,104			13,104	30.07	*	7,999	22.97	*	-33,029	-33,029	52.82
Sub Total==>	25,945	728		26,673	61.21	*	20,840	59.84	*	-59,819	-62,529	100.00
Internal Loads												
Lights	11,668	0		11,668	26.78	*	11,668	33.50	*	0	0	0.00
People	4,690			4,690	10.76	*	2,141	6.15	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	16,359	0	0	16,359	37.54	*	13,810	39.65	*	0	0	0.00
Ceiling Load	179	-179		0	0.00	*	179	0.51	*	-665	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				544	1.25	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	-0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	42,482	549	0	43,576	100.00	*	34,828	100.00	*	-60,484	-62,529	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	3.6	43.6	35.9	2,550 75.2 65.7 82.3	62.3 60.5 78.0	2,849		
Aux Clg	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	Part	128	
Opt Vent	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	0	
Totals	3.6	43.6				Roof	0	0 0
						Wall	1,248	149 12

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F								
Main Htg	-62.5	2,550	67.3	89.8	Vent	0	0	Clg Cfm/Sqft	0.90	SADB	62.4	89.8
Aux Htg	0.0	0	0.0	0.0	Infil	474	474	Clg Cfm/Ton	702.23	Plenum	75.2	67.3
Preheat	-0.0	2,550	67.3	62.3	Supply	2,550	2,550	Clg Sqft/Ton	784.56	Return	75.2	67.3
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	15.30	Ret/OA	75.2	67.3
Humidif	0.0	0	0.0	0.0	Return	2,550	2,550	No. People	10	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-62.5				Rm Exh	0	0	Htg Cfm/Sqft	0.90	Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/Sqft	-21.95	Fn Frict	0.1	0.0

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 3 Block RAD - RADIATION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	-170,485	9.43
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-186,742	-186,742	10.33
Wall Cond	0	0		0	0.00	*	0	0.00	*	-524,509	-581,696	32.18
Partition	0			0	0.00	*	0	0.00	*	-4,712	-4,712	0.26
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-863,723	-863,723	47.79
Sub.Total==>	0	0		0	0.00	*	0	0.00	*	-1,579,686	-1,807,358	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub.Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	-273,486	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-1,853,171	-1,807,358	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total	Area-- Glass (sf) (%)
Main Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Floor	79,849
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Part	1,820
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	0
Totals	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Roof	27,566 0 0
						Wall	32,636 5,491 17

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	ENGINEERING CHECKS--	TEMPERATURES (F)---
Main Htg	-1,807.4	0	0.0	0.0	Vent	0	0	Clg % OA 0.0	Type Clg Htg
Aux Htg	0.0	0	0.0	0.0	Infil	0	12,402	Clg Cfm/Sqft 0.00	SADB 0.0 68.1
Preheat	0.0	0	0.0	0.0	Supply	0	0	Clg Cfm/Ton 0.00	Plenum 0.0 56.2
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Sqft/Ton 0.00	Return 0.0 66.0
Humidif	0.0	0	0.0	0.0	Return	0	0	Clg Btuh/Sqft 0.00	Ret/OA 0.0 66.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	No. People 0	Runarnd 0.0 68.0
Total	-1,807.4				Rm Exh	0	0	Htg % OA 0.0	Fn MtrTD 0.0 0.0
					Auxil	0	0	Htg Cfm/SqFt 0.00	Fn BldTD 0.0 0.0
								Htg Btuh/SqFt -22.63	Fn Frict 0.0 0.0

BUILDING U-VALUES - ALTERNATIVE 2
WEATHERSTRIP & CAULKING

----- B U I L D I N G U - V A L U E S -----

		----- Room U-Values -----									Room	Room
		(Btu/hr/sqft/F)									Mass	Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
3	POST NURSERY	0.000	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	60.5	13.03
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	60.5	13.03
System	1 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	60.5	13.03
4	POST NURSERY	0.144	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	75.2	16.49
Zone	4 Total/Ave.	0.144	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	75.2	16.49
System	2 Total/Ave.	0.144	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	75.2	16.49
1	1ST FL APART'S	0.000	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	62.4	13.44
Zone	1 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	62.4	13.44
2	2ND FL APART'S	0.000	0.000	0.000	0.000	0.146	0.520	0.531	0.343	0.317	81.2	17.94
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.146	0.520	0.531	0.343	0.317	81.2	17.94
3	POST NURSERY	0.000	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	60.5	13.03
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	60.5	13.03
5	BASEMENT	0.144	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	67.7	15.04
Zone	5 Total/Ave.	0.144	0.000	0.000	0.000	0.000	0.520	0.531	0.343	0.317	67.7	15.04
System	3 Total/Ave.	0.144	0.000	0.000	0.000	0.146	0.520	0.531	0.343	0.317	70.3	15.43
Building		0.144	0.000	0.000	0.000	0.146	0.520	0.531	0.343	0.317	70.2	15.40

BUILDING AREAS - ALTERNATIVE 2
WEATHERSTRIP & CAULKING

----- B U I L D I N G A R E A S -----													
Room Number	Description	Number of Duplicate		Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
3	POST NURSERY	1	1	2,260	2,260	0	0	0	0	0	124	13	804
Zone	3 Total/Ave.				2,260	0	0	0	0	0	124	13	804
System	1 Total/Ave.				2,260	0	0	0	0	0	124	13	804
4	POST NURSERY	1	1	2,849	2,849	128	0	0	0	0	149	12	1,099
Zone	4 Total/Ave.				2,849	128	0	0	0	0	149	12	1,099
System	2 Total/Ave.				2,849	128	0	0	0	0	149	12	1,099
1	1ST FL APART'S	1	1	27,566	27,566	0	0	0	0	0	2,343	19	10,201
Zone	1 Total/Ave.				27,566	0	0	0	0	0	2,343	19	10,201
2	2ND FL APART'S	1	1	27,566	27,566	0	0	0	0	27,566	2,343	19	10,201
Zone	2 Total/Ave.				27,566	0	0	0	0	27,566	2,343	19	10,201
3	POST NURSERY	1	1	2,260	2,260	0	0	0	0	0	124	13	804
Zone	3 Total/Ave.				2,260	0	0	0	0	0	124	13	804
5	BASEMENT	1	1	22,457	22,457	1,820	0	0	0	0	681	10	5,939
Zone	5 Total/Ave.				22,457	1,820	0	0	0	0	681	10	5,939
System	3 Total/Ave.				79,849	1,820	0	0	0	27,566	5,491	17	27,145
Building					84,958	1,948	0	0	0	27,566	5,764	17	29,048

ASHRAE 90 ANALYSIS - ALTERNATIVE 2
WEATHERSTRIP & CAULKING

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.146 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.372 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.272 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTvr) = 10.03 (Btu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTvw) = 15.06 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2
WEATHERSTRIP & CAULKING

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.3	8	64	-95,815	6	271	252.5	0	0	0.0	0	0
5 - 10	0.6	2	16	-191,630	8	364	505.0	0	0	0.0	0	0
10 - 15	1.0	0	0	-287,445	12	535	757.5	0	0	0.0	0	0
15 - 20	1.3	6	46	-383,260	10	450	1,010.0	0	0	0.0	0	0
20 - 25	1.6	10	84	-479,075	13	556	1,262.5	0	0	0.0	0	0
25 - 30	1.9	8	61	-574,890	12	520	1,515.0	0	0	0.0	0	0
30 - 35	2.3	2	16	-670,705	11	485	1,767.5	0	0	0.0	0	0
35 - 40	2.6	7	57	-766,520	11	461	2,020.0	0	0	0.0	0	0
40 - 45	2.9	7	53	-862,335	4	160	2,272.5	0	0	0.0	0	0
45 - 50	3.2	3	23	-958,150	3	117	2,525.0	0	0	0.0	0	0
50 - 55	3.6	5	40	-1,053,965	4	177	2,777.5	58	1,450	0.0	0	0
55 - 60	3.9	8	68	-1,149,780	4	190	3,030.0	0	0	0.0	0	0
60 - 65	4.2	0	0	-1,245,596	2	95	3,282.5	0	0	0.0	0	0
65 - 70	4.5	2	15	-1,341,411	0	0	3,535.0	0	0	0.0	0	0
70 - 75	4.9	4	34	-1,437,226	0	0	3,787.5	0	0	0.0	0	0
75 - 80	5.2	4	30	-1,533,041	0	0	4,040.0	0	0	0.0	0	0
80 - 85	5.5	0	0	-1,628,856	0	0	4,292.5	0	0	0.0	0	0
85 - 90	5.8	1	5	-1,724,671	0	0	4,545.0	0	0	0.0	0	0
90 - 95	6.2	1	5	-1,820,486	0	0	4,797.5	0	0	0.0	0	0
95 - 100	6.5	24	193	-1,916,301	0	0	5,050.0	42	1,070	0.0	0	0
Hours Off	0.0	0	7,950	0	0	4,379	0.0	0	6,240	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2
WEATHERSTRIP & CAULKING

----- B U I L D I N G T E M P E R A T U R E P R O F I L E S -----

Temperature Range (F)	----- Zone Number -----					
	3	4	1	2	3	5
Max. Temp.	82.8	82.5	98.7	98.1	100.6	98.3
Mo./Hr.	7 2	7 2	8 23	8 23	8 20	8 16
Day Type	5	5	1	1	1	2
	..... Number of Hours					
Above 100	0	0	0	0	396	0
95 - 100	0	0	1,304	1,216	912	842
90 - 95	0	0	837	590	1,280	1,190
85 - 90	0	0	787	966	308	896
80 - 85	619	421	232	357	374	326
75 - 80	2,333	2,844	631	594	589	738
70 - 75	1,111	855	313	365	257	264
65 - 70	101	2,398	4,656	4,672	2,129	2,452
60 - 65	701	1,122	0	0	1,309	1,125
55 - 60	826	542	0	0	480	549
50 - 55	721	345	0	0	726	378
Below 50	2,348	233	0	0	0	0
Min. Temp.	34.4	44.9	67.9	67.9	54.9	54.9
Mo./Hr.	2 7	2 7	1 7	1 19	1 15	2 3
Day Type	5	5	1	2	3	4

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2
WEATHERSTRIP & CAULKING

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	HOT WTR	HOT W DMND
	Off Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	15,991	73	5,469	12
Feb	14,460	73	5,318	12
March	16,999	73	3,278	10
April	15,303	73	927	8
May	16,557	73	0	0
June	17,439	83	0	0
July	17,239	83	0	0
Aug	18,168	83	0	0
Sept	15,645	82	0	0
Oct	16,471	73	331	4
Nov	15,313	73	2,378	9
Dec	15,488	73	4,547	11
Total	195,072	83	22,246	12

Building Energy Consumption = 34,022 (Btu/Sq Ft/Year)
Source Energy Consumption = 58,426 (Btu/Sq Ft/Year)

Floor Area = 84,958 (Sq Ft)

----- EQUIPMENT ENERGY CONSUMPTION -----

Ref Num	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	15891	14369	16891	15217	16391	16217	15390	16891	15217	16391	15217	15390	189,471
	PK	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3
1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH2O	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1161		AIR-CLD COND COMP <15 TONS											
	ELEC	0	0	0	0	0	386	628	371	66	0	0	0	1,451
	PK	0.0	0.0	0.0	0.0	0.0	3.8	4.0	3.8	3.7	0.0	0.0	0.0	4.0
1	EQ5200		CONDENSER FANS											
	ELEC	0	0	0	0	0	33	61	32	7	0	0	0	133
	PK	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.3	0.2	0.0	0.0	0.0	0.4
1	EQ5303		CONTROLS											
	ELEC	0	0	0	0	0	66	60	69	19	0	0	0	214
	PK	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
2	EQ1161		AIR-CLD COND COMP <15 TONS											
	ELEC	0	0	0	0	0	466	809	518	130	0	0	0	1,923
	PK	0.0	0.0	0.0	0.0	0.0	4.9	5.0	4.9	4.7	0.0	0.0	0.0	5.0
2	EQ5200		CONDENSER FANS											
	ELEC	0	0	0	0	0	39	79	44	12	0	0	0	174
	PK	0.0	0.0	0.0	0.0	0.0	0.4	0.5	0.4	0.3	0.0	0.0	0.0	0.5
2	EQ5303		CONTROLS											

[illegible]

UTILITY PEAK CHECKSUMS - ALTERNATIVE 2
WEATHERSTRIP & CAULKING

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 83.4 (kW)
Yearly Time of Peak 16 (hr) 7 (mo)

Hour 16 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Perct Of Tot (%)
Cooling Equipment				
1	EQ1161	AIR-CLD COND COMP <15 TONS	4.6	5.52
2	EQ1161	AIR-CLD COND COMP <15 TONS	5.8	6.91
Sub Total			10.4	12.43
Sub Total			0.0	0.00
Air Moving Equipment				
1		SUMMATION OF FAN ELECTRICAL DEMAND	0.4	0.51
2		SUMMATION OF FAN ELECTRICAL DEMAND	0.3	0.39
Sub Total			0.8	0.91
Sub Total			0.0	0.00
Miscellaneous				
	Lights		72.3	86.67
	Base Utilities		0.0	0.00
	Misc Equipment		0.0	0.00
Sub Total			72.3	86.67
Grand Total			83.4	100.00

Building 118
Trace Input File

933702

CONTENTS OF : E:\CB118.TM

LINE #	
1	JOB - 1
2	01/ENERGY SAVINGS OPPORTUNITY STUDY
3	01/CARLISLE BARRACKS, PA
4	01/DEPARTMENT OF THE ARMY
5	01/BENATEC ASSOCIATES
6	01/BUILDING 118
7	08/CARLISLE
8	09/JUL/JUL/19///APR/OCT
9	10/CLTD-CLF
10	11///ZONE
11	LOAD - 1
12	19/1/BASE BUILDING
13	20/1/1/MANAGERS OFFICE/200/1/1/7/.39/17
14	20/2/1/LOBBY/214/1/1/3/.39/21
15	20/3/1/LOUNGE/114/1/1/7/.39/17
16	20/4/1/MENS TOILET/39/1/1/7/.39/17
17	20/5/1/WOMENS TOILET/41/1/1/7/.39/17
18	20/6/2/FOYER & HALLWAYS/329/1/1/5/.39/23.5
19	20/7/2/AUDITORIUM/2461/1/1/5/.39/25.5
20	20/8/3/STAGE/828/1/1/5/.39/23.5
21	21/M///CBTHTX///CBTHTX
22	22/1/1/NO/18.75/12//150/122/65
23	22/2/1/NO/14/10.5//150/122/65
24	22/2/2/NO/14/10.5//150/302/65
25	22/3/1/NO/10.7/12//150/302/65
26	22/4/1/NO/7.75/5.5//150/302/65
27	22/5/1/NO/7.75/5.8//150/302/65
28	22/6/1/NO/175/1//150/122/65
29	22/6/2/NO/175/1//150/302/65
30	22/7/1/NO/53.5/24//150/122/65
31	22/7/2/NO/53.5/24//150/302/65
32	22/8/1/NO/17/24//150/122/65
33	22/8/2/NO/17/24//150/302/65
34	24/1/1/18.75/9.5//169/122
35	24/1/2/10.75/9.5//169/212
36	24/2/1/15/17.5//169/212
37	24/3/1/10.75/9.5//169/212
38	24/3/2/10.75/9.5//169/302
39	24/4/1/7.75/9.5//169/302
40	24/6/1/7/18//170/122
41	24/6/2/150/1//170/212
42	24/6/3/7/18//170/302
43	24/7/1/53.5/20//170/122
44	24/7/2/53.5/20//170/302
45	24/8/1/17.5/18//169/302
46	24/8/2/46/18//169/32
47	24/8/3/17.5/18//169/122
48	25/1/1/3.5/2.5/2/.58/.57
49	25/2/1/109/1/1/.65/.88
50	25/3/2/3.5/2.5/1/.58/.57
51	25/4/1/3.5/2.5/1/.58/.57
52	26/M/CBTHP/CBTHL/CBTHFAN//OFF/CBTHFAN/OFF/OFF/OFF/OFF
53	27/1/2/PEOPLE/230/190/1.5/WATT-SF
54	27/2/////1.5/WATT-SF
55	27/3/////1.5/WATT-SF.
56	27/4/////1.5/WATT-SF
57	27/5/////1.5/WATT-SF
58	27/6/////1.5/WATT-SF

CONTENTS OF : E:\CB118.TM

LINE #	-----
59	27/7/200/PEOPLE/210/140/0/WATT-SF
60	29/1////////.29/CFM-SF
61	29/2////////.29/CFM-SF
62	29/3////////.29/CFM-SF
63	29/4////////.29/CFM-SF
64	29/5////////.29/CFM-SF
65	29/6/10/PCT-MCLG/10/PCT-MHTG/.29/CFM-SF/.29/CFM-SF
66	29/7/10/PCT-MCLG/10/PCT-MHTG/.29/CFM-SF/.29/CFM-SF
67	29/8////////.29/CFM-SF
68	30/6/3.58/CFM-SF/3.58/CFM-SF
69	30/7/3.58/CFM-SF/3.58/CFM-SF
70	SYSTEM - 1
71	39/1/BASE BUILDING
72	40/1/RAD
73	41/1/1/1/3/3
74	42/1
75	44/1
76	45/1/OFF/OFF/OFF/OFF/OFF/CBTHHTG/OFF/OFF/OFF/OFF
77	40/2/SZ
78	41/2/2/2
79	42/2/.5
80	44/2/DRY-BULB/65/100
81	45/2/CBTHCLG/AVAIL/OFF/OFF/OFF/CBTHHTG/OFF/OFF/OFF/OFF
82	EQUIPMENT - 1
83	59/1/CARLISLE///BASE BUILDING
84	60/1/1/BLKPLANT/2/2
85	62/1/EQ1170L/1
86	65/1/1//1/2
87	67/1/EQ2102/1
88	69/1
89	69/2/EQ4003
90	LOAD - 2
91	19/2/WALL & ROOF INSULATION
92	20/1/1/MANAGERS OFFICE/200/1/1/7/.39/17
93	20/2/1/LOBBY/214/1/1/3/.39/21
94	20/3/1/LOUNGE/114/1/1/7/.39/17
95	20/4/1/MENS TOILET/39/1/1/7/.39/17
96	20/5/1/WOMENS TOILET/41/1/1/7/.39/17
97	20/6/2/FOYER & HALLWAYS/329/1/1/5/.39/23.5
98	20/7/2/AUDITORIUM/2461/1/1/5/.39/25.5
99	20/8/3/STAGE/828/1/1/5/.39/23.5
100	21/M////CBTHTX///CBTHTX
101	22/1/1/NO/18.75/12//185/122/65
102	22/2/1/NO/14/10.5//185/122/65
103	22/2/2/NO/14/10.5//185/302/65
104	22/3/1/NO/10.7/12//185/302/65
105	22/4/1/NO/7.75/5.5//185/302/65
106	22/5/1/NO/7.75/5.8//185/302/65
107	22/6/1/NO/175/1//185/122/65
108	22/6/2/NO/175/1//185/302/65
109	22/7/1/NO/53.5/24//185/122/65
110	22/7/2/NO/53.5/24//185/302/65
111	22/8/1/NO/17/24//185/122/65
112	22/8/2/NO/17/24//185/302/65
113	24/1/1/18.75/9.5//183/122
114	24/1/2/10.75/9.5//183/212
115	24/2/1/15/17.5//183/212
116	24/3/1/10.75/9.5//183/212

CONTENTS OF : E:\CB118.TM

LINE #	
117	24/3/2/10.75/9.5//183/302
118	24/4/1/7.75/9.5//183/302
119	24/6/1/7/18//184/122
120	24/6/2/150/1//184/212
121	24/6/3/7/18//184/302
122	24/7/1/53.5/20//184/122
123	24/7/2/53.5/20//184/302
124	24/8/1/17.5/18//183/302
125	24/8/2/46/18//183/32
126	24/8/3/17.5/18//183/122
127	25/1/1/3.5/2.5/2/.58/.57
128	25/2/1/109/1/1/.65/.88
129	25/3/2/3.5/2.5/1/.58/.57
130	25/4/1/3.5/2.5/1/.58/.57
131	26/M/CBTHP/CBTHL/CBTHFAN//OFF/CBTHFAN/OFF/OFF/OFF/OFF
132	27/1/2/PEOPLE/230/190/1.5/WATT-SF
133	27/2/////1.5/WATT-SF
134	27/3/////1.5/WATT-SF
135	27/4/////1.5/WATT-SF
136	27/5/////1.5/WATT-SF
137	27/6/////1.5/WATT-SF
138	27/7/200/PEOPLE/210/140/0/WATT-SF
139	29/1////////.21/CFM-SF
140	29/2////////.21/CFM-SF
141	29/3////////.21/CFM-SF
142	29/4////////.21/CFM-SF
143	29/5////////.21/CFM-SF
144	29/6/10/PCT-MCLG/10/PCT-MHTG/.21/CFM-SF/.21/CFM-SF
145	29/7/10/PCT-MCLG/10/PCT-MHTG/.21/CFM-SF/.21/CFM-SF
146	29/8////////.21/CFM-SF
147	30/6/3.58/CFM-SF/3.58/CFM-SF
148	30/7/3.58/CFM-SF/3.58/CFM-SF
149	SYSTEM - 2
150	39/2/WALL & ROOF INSULATION
151	40/1/RAD
152	41/1/1/1/3/3
153	42/1
154	44/1
155	45/1/OFF/OFF/OFF/OFF/OFF/CBTHHTG/OFF/OFF/OFF/OFF
156	40/2/SZ
157	41/2/2/2
158	42/2/.5
159	44/2/DRY-BULB/65/100
160	45/2/CBTHCLG/AVAIL/OFF/OFF/OFF/CBTHHTG/OFF/OFF/OFF/OFF
161	EQUIPMENT - 2
162	59/2/CARLISLE///WALL & ROOF INSULATION
163	60/1/1/BLKPLANT/2/2
164	62/1/EQ1170L/1
165	65/1/1//1/2
166	67/1/EQ2102/1
167	69/1
168	69/2/EQ4003

Building 118
Trace Output File

933702

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*****  
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**  
**          T R A C E    6 0 0    A N A L Y S I S          **  
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**          by          **  
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 118

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Relectance: 0.20
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: July To July
System Simulation Period: January To December
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 9:45:24 1/25/94
Dataset Name: CB118 .TM

AIRFLOW - ALTERNATIVE 1
BASE BUILDING

----- SYSTEM SUMMARY -----
(Design Airflow Quantities)

System Number	System Type	Main					Auxil. Supply	Room Exhaust
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Airflow (Cfm)	Airflow (Cfm)
1	RAD	0	0	0	0	661	0	0
2	SZ	1,030	10,301	10,301	11,039	10,301	0	0
Totals		1,030	10,301	10,301	11,039	10,962	0	0

CAPACITY - ALTERNATIVE 1
BASE BUILDING

----- SYSTEM SUMMARY -----
(Design Capacity Quantities)

System Number	System Type	Cooling					Heating						
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Sys. Opt. Capacity (Tons)	Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Capacity (Btuh)	Vent Capacity (Btuh)
1	RAD	0.0	0.0	0.0	0.0	0.0	-121,401	0	0	0	0	0	0
2	SZ	5.9	0.0	0.0	0.0	5.9	-180,542	0	-177,011	0	0	0	0
Totals		5.9	0.0	0.0	0.0	5.9	-301,943	0	-177,011	0	0	0	0

The building peaked at hour 19 month 7 with a capacity of 5.9 tons

ENGINEERING CHECKS - ALTERNATIVE 1
BASE BUILDING

----- ENGINEERING CHECKS -----

System Number	Main/Auxiliary	System Type	Percent Outside Air	Cooling				Heating		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-84.54	1,436
2	Main	SZ	10.00	3.69	1,733.6	469.5	25.56	3.69	-64.71	2,790

```
***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==>           Mo/Hr: 0/ 0           *           Mo/Hr: 0/ 0           *           Mo/Hr: 13/ 1
Outside Air ==>           OADB/WB/HR: 0/ 0/ 0.0       *           OADB: 0           *           OADB: 4
```

	Space Sens+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads						*			*			
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	-19,375	15.96
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-5,984	-5,984	4.93
Wall Cond	0	0		0	0.00	*	0	0.00	*	-42,382	-50,019	41.20
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-46,022	-46,022	37.91
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-94,388	-121,401	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	-26,808	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
						*			*			
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-121,197	-121,401	100.00

-COOLING COIL SELECTION-

	Total Capacity		Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	Glass (%)
	(Tons)	(Mbh)			Deg F	Deg F	Grains	Deg F	Deg F	Grains			
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Floor	1,436	
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	0	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0	
Totals	0.0	0.0									Roof	1,551	0 0
											Wall	2,279	144 6

-HEATING COIL SELECTION-

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Engineering Checks		Term Extrnals (°F)		
	(Mbh)	(cfm)	Deg F	Deg F	Vent			Clg % OA	0.0	Type	Clg	Htg
Main Htg	-121.4	0	0.0	0.0	Infil	0	661	Clg Cfm/Sqft	0.00	SADB	0.0	68.1
Aux Htg	0.0	0	0.0	0.0	Supply	0	0	Clg Sqft/Ton	0.00	Plenum	0.0	35.6
Preheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Return	0.0	36.5
Reheat	0.0	0	0.0	0.0	Return	0	0	No. People	0	Ret/OA	0.0	36.5
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Runarnd	0.0	68.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/SqFt	0.00	Fn MtrTD	0.0	0.0
Total	-121.4				Auxil	0	0	Htg Btuh/SqFt	-84.54	Fn BldTD	0.0	0.0
										Fn Frict	0.0	0.0

-AIRFLOWS (cfm)-

Type	Cooling	Heating
Vent	0	0
Infil	0	661
Supply	0	0
Mincfm	0	0
Return	0	0
Exhaust	0	0
Rm Exh	0	0
Auxil	0	0

--ENGINEERING CHECKS--

Clg % OA	0.0
Clg Cfm/Sqft	0.00
Clg Cfm/Ton	0.00
Clg Sqft/Ton	0.00
Clg Btuh/Sqft	0.00
No. People	0
Htg % OA	0.0
Htg Cfm/SqFt	0.00
Htg Btuh/SqFt	-84.54

--TEMPERATURES (F)---

Type	Clg	Htg
SAD8	0.0	68.1
Plenum	0.0	35.6
Return	0.0	36.5
Ret/OA	0.0	68.5
Runarnd	0.0	68.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

System 2 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/19 * Mo/Hr: 7/19 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 85/ 70/ 91.0 * OADB: 85 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct	Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot	Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)	(Btuh)	(Btuh)	(%)
Envelope Loads											
Skylite Solr	0	0		0	0.00		0	0.00	0	0	0.00
Skylite Cond	0	0		0	0.00		0	0.00	0	0	0.00
Roof Cond	0	39,494		39,494	55.39		0	0.00	0	-67,000	37.35
Glass Solar	0	0		0	0.00		0	0.00	0	0	0.00
Glass Cond	0	0		0	0.00		0	0.00	0	0	0.00
Wall Cond	16,350	3,459		19,810	27.78		16,350	52.41	-44,736	-54,771	30.53
Partition	0			0	0.00		0	0.00	0	0	0.00
Exposed Floor	0			0	0.00		0	0.00	0	0	0.00
Infiltration	4,447			4,447	6.24		7,862	25.20	-51,341	-51,341	28.62
Sub Total==>	20,797	42,954		63,751	89.40		24,212	77.61	-96,077	-173,113	96.51
Internal Loads											
Lights	152	0		152	0.21		152	0.49	0	0	0.00
People	420			420	0.59		420	1.35	0	0	0.00
Misc	0	0	0	0	0.00		0	0.00	0	0	0.00
Sub Total==>	572	0	0	572	0.80		572	1.83	0	0	0.00
Ceiling Load	5,430	-5,430		0	0.00		5,464	17.51	-9,558	0	0.00
Outside Air	0	0	0	6,214	8.71		0	0.00	0	0	0.00
Sup. Fan Heat				3,663	5.14			0.00		0	0.00
Ret. Fan Heat		0		0	0.00			0.00		0	0.00
Duct Heat Pkup		0		0	0.00			0.00		0	0.00
OV/UNDR Sizing	949			949	1.33		949	3.04	-6,269	-6,269	3.49
Exhaust Heat		-3,841	0	-3,841	-5.39			0.00		0	0.00
Terminal Bypass		0	0	0	0.00			0.00		0	0.00
Grand Total==>	27,748	33,682	0	71,307	100.00		31,196	100.00	-111,904	-179,382	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	5.9	71.3	79.5	10,301 79.1 69.7 97.1	71.9 67.8 98.4	2,790		
Aux Clg	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Opt Vent	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	5.9	71.3				2,918	0	0
						2,542	0	0

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	10.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent			Clg Cfm/Sqft	3.69	SADB	72.2	78.0
Main Htg	-180.5	10,301	61.9	78.0	Infil	737	737	Clg Cfm/Ton	1733.59	Plenum	78.4	61.9
Aux Htg	0.0	0	0.0	0.0	Supply	10,301	10,301	Clg Sqft/Ton	469.52	Return	78.4	61.9
Preheat	-177.0	10,301	56.1	71.9	Mincfm	0	0	Clg Btuh/Sqft	25.56	Ret/OA	79.1	61.9
Reheat	0.0	0	0.0	0.0	Return	10,301	10,301	No. People	200	Runarnd	75.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	1,030	0	Htg % OA	0.0	Fn MtrTD	0.1	0.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	3.69	Fn BldTD	0.1	0.0
Total	-180.5				Auxil	0	0	Htg Btuh/Sqft	-64.71	Fn Frict	0.2	0.0

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

BUILDING U-VALUES - ALTERNATIVE 1
BASE BUILDING

----- B U I L D I N G U - V A L U E S -----

Room Number	Description	Part.	ExFlr	Room U-Values (Btu/hr/sqft/F)							Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
				Summr Skylt	Wintr Skylt	Roof	Summr Windo	Wintr Windo	Wall	Ceil.		
1	MANAGERS OFFICE	0.000	0.000	0.000	0.000	0.397	0.580	0.594	0.425	0.568	183.0	43.33
2	LOBBY	0.000	0.000	0.000	0.000	0.397	0.650	0.668	0.425	0.568	106.9	26.72
3	LOUNGE	0.000	0.000	0.000	0.000	0.397	0.580	0.594	0.425	0.568	235.2	54.80
4	MENS TOILET	0.000	0.000	0.000	0.000	0.397	0.580	0.594	0.425	0.568	228.3	53.27
5	WOMENS TOILET	0.000	0.000	0.000	0.000	0.397	0.000	0.000	0.000	0.568	12.1	5.70
Zone 1	Total/Ave.	0.000	0.000	0.000	0.000	0.397	0.633	0.650	0.425	0.568	157.4	37.74
8	STAGE	0.000	0.000	0.000	0.000	0.397	0.000	0.000	0.425	0.568	240.4	55.86
Zone 3	Total/Ave.	0.000	0.000	0.000	0.000	0.397	0.000	0.000	0.425	0.568	240.4	55.86
System 1	Total/Ave.	0.000	0.000	0.000	0.000	0.397	0.633	0.650	0.425	0.568	205.3	48.19
6	FOYER & HALLWAYS	0.000	0.000	0.000	0.000	0.397	0.000	0.000	0.343	0.568	174.0	41.23
7	AUDITORIUM	0.000	0.000	0.000	0.000	0.397	0.000	0.000	0.343	0.568	127.1	30.93
Zone 2	Total/Ave.	0.000	0.000	0.000	0.000	0.397	0.000	0.000	0.343	0.568	132.7	32.14
System 2	Total/Ave.	0.000	0.000	0.000	0.000	0.397	0.000	0.000	0.343	0.568	132.7	32.14
Building		0.000	0.000	0.000	0.000	0.397	0.633	0.650	0.381	0.568	157.3	37.59

BUILDING AREAS - ALTERNATIVE 1
BASE BUILDING

----- B U I L D I N G A R E A S -----

Room Number	Description	Number of Duplicate		Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed		Skl Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
		Flr	Rm				Floor Area (sqft)	Skylight Area (sqft)						
1	MANAGERS OFFICE	1	1	200	200	0	0	0	0	0	225	18	6	263
2	LOBBY	1	1	214	214	0	0	0	0	0	294	109	42	153
3	LOUNGE	1	1	114	114	0	0	0	0	0	128	9	4	195
4	MENS TOILET	1	1	39	39	0	0	0	0	0	43	9	12	65
5	WOMENS TOILET	1	1	41	41	0	0	0	0	0	45	0	0	0
Zone 1	Total/Ave.				608	0	0	0	0	0	735	144	18	677
8	STAGE	1	1	828	828	0	0	0	0	0	816	0	0	1,458
Zone 3	Total/Ave.				828	0	0	0	0	0	816	0	0	1,458
System 1	Total/Ave.				1,436	0	0	0	0	0	1,551	144	6	2,135
6	FOYER & HALLWAYS	1	1	329	329	0	0	0	0	0	350	0	0	402
7	AUDITORIUM	1	1	2,461	2,461	0	0	0	0	0	2,568	0	0	2,140
Zone 2	Total/Ave.				2,790	0	0	0	0	0	2,918	0	0	2,542
System 2	Total/Ave.				2,790	0	0	0	0	0	2,918	0	0	2,542
Building					4,226	0	0	0	0	0	4,469	144	3	4,677

ASHRAE 90 ANALYSIS - ALTERNATIVE 1
BASE BUILDING

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.397 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.388 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.392 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 35.60 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTVw) = 5.59 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1
BASE BUILDING

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.3	0	0	-23,948	0	0	515.1	0	0	0.0	0	0
5 - 10	0.6	0	0	-47,895	0	18	1,030.1	0	0	0.0	0	0
10 - 15	0.9	0	0	-71,843	0	3	1,545.2	0	0	0.0	0	0
15 - 20	1.2	7	10	-95,791	0	14	2,060.3	0	0	0.0	0	0
20 - 25	1.5	3	5	-119,739	3	98	2,575.4	0	0	0.0	0	0
25 - 30	1.8	0	0	-143,686	3	111	3,090.4	0	0	0.0	0	0
30 - 35	2.1	0	0	-167,634	9	347	3,605.5	0	0	0.0	0	0
35 - 40	2.4	0	0	-191,582	15	532	4,120.6	0	0	0.0	0	0
40 - 45	2.7	0	0	-215,529	31	1,131	4,635.6	0	0	0.0	0	0
45 - 50	3.0	0	0	-239,477	14	516	5,150.7	71	6,205	0.0	0	0
50 - 55	3.3	0	0	-263,425	10	351	5,665.8	0	0	0.0	0	0
55 - 60	3.6	0	0	-287,373	7	255	6,180.8	0	0	0.0	0	0
60 - 65	3.9	0	0	-311,320	8	290	6,695.9	0	0	0.0	0	0
65 - 70	4.2	0	0	-335,268	0	0	7,211.0	0	0	0.0	0	0
70 - 75	4.5	0	0	-359,216	0	0	7,726.1	0	0	0.0	0	0
75 - 80	4.8	0	0	-383,163	0	0	8,241.1	0	0	0.0	0	0
80 - 85	5.1	0	0	-407,111	0	0	8,756.2	0	0	0.0	0	0
85 - 90	5.3	0	0	-431,059	0	0	9,271.3	0	0	0.0	0	0
90 - 95	5.6	0	0	-455,006	0	0	9,786.3	0	0	0.0	0	0
95 - 100	5.9	90	135	-478,954	0	0	10,301.4	29	2,555	0.0	0	0
Hours Off	0.0	0	8,610	0	0	5,094	0.0	0	0	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1
 BASE BUILDING

----- BUILDING TEMPERATURE PROFILES -----

Temperature	----- Zone Number -----		
Range	1	3	2
(F)			

Max. Temp.	97.7	95.0	87.7
Mo./Hr.	8 21	4 23	7 17
Day Type	1	2	1

	..... Number of Hours		
Above 100	0	0	0
95 - 100	646	0	0
90 - 95	3,221	486	0
85 - 90	1,739	2,133	333
80 - 85	944	2,083	1,445
75 - 80	696	1,638	1,514
70 - 75	674	1,054	1,882
65 - 70	421	728	2,087
60 - 65	198	336	910
55 - 60	180	209	353
50 - 55	41	93	179
Below 50	0	0	57

Min. Temp.	53.6	51.5	48.3
Mo./Hr.	2 24	2 24	2 24
Day Type	4	4	4

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1
BASE BUILDING

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	HOT WTR	HOT W DMND
	Off Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	1,167	4	1,325	3
Feb	1,055	4	1,200	3
March	1,168	4	1,179	3
April	1,129	4	804	2
May	1,184	9	0	0
June	1,373	9	0	0
July	1,506	9	0	0
Aug	1,408	9	0	0
Sept	1,124	9	0	0
Oct	1,168	4	895	2
Nov	1,130	4	1,008	3
Dec	1,168	4	1,266	3
Total	14,581	9	7,677	3

Building Energy Consumption = 193,447 (Btu/Sq Ft/Year)
Source Energy Consumption = 277,559 (Btu/Sq Ft/Year)

Floor Area = 4,226 (Sq Ft)

----- EQUIPMENT ENERGY CONSUMPTION -----

[illegible]

[illegible]

UTILITY PEAK CHECKSUMS - ALTERNATIVE 1
BASE BUILDING

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 9.0 (kW)
Yearly Time of Peak 18 (hr) 7 (mo)

Hour 18 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Perct Of Tot (%)
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Cooling Equipment

1	EQ1170L	AIR-CLD COND COMP >20 TONS	6.7	74.06
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Sub Total			6.7	74.06
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Sub Total			0.0	0.00
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Air Moving Equipment

2		SUMMATION OF FAN ELECTRICAL DEMAND	2.2	24.38
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Sub Total			2.2	24.38
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Sub Total			0.0	0.00
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Miscellaneous

Lights			0.1	1.55
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Base Utilities			0.0	0.00
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Misc Equipment			0.0	0.00
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Sub Total			0.1	1.55
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Grand Total			9.0	100.00
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**          T R A C E   6 0 0   A N A L Y S I S          **  
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 118

Weather File Code:	CARLISLE
Location:	ENERGY SAVINGS OPPORTUNITY STUDY
Latitude:	40.2 (deg)
Longitude:	77.2 (deg)
Time Zone:	5
Elevation:	475 (ft)
Barometric Pressure:	29.2 (in. Hg)

Summer Clearness Number:	1.00
Winter Clearness Number:	1.00
Summer Design Dry Bulb:	92 (F)
Summer Design Wet Bulb:	72 (F)
Winter Design Dry Bulb:	4 (F)
Summer Ground Reflectance:	0.20
Winter Ground Reflectance:	0.20

Air Density:	0.0742 (Lbm/cuft)
Air Specific Heat:	0.2444 (Btu/lbm/F)
Density-Specific Heat Prod:	1.0862 (Btu-min./hr/cuft/F)
Latent Heat Factor:	4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor:	4.4519 (Lb-min./hr/cuft)

Design Simulation Period:	July	To July
System Simulation Period:	January	To December
Cooling Load Methodology:	CLTD/CLF (Transfer Function Method)	

Time/Date Program was Run:	9:53:53	1/25/94
Dataset Name:	CB118 .TM	

AIRFLOW - ALTERNATIVE 2
WALL & ROOF INSULATION

----- S Y S T E M S U M M A R Y -----
(Design Airflow Quantities)

System Number	System Type	Main					Auxil. Supply	Room Exhaust
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Airflow (Cfm)	Airflow (Cfm)
1	RAD	0	0	0	0	479	0	0
2	SZ	1,040	10,405	10,405	10,938	10,405	0	0
Totals		1,040	10,405	10,405	10,938	10,883	0	0

CAPACITY - ALTERNATIVE 2
WALL & ROOF INSULATION

----- S Y S T E M S U M M A R Y -----
(Design Capacity Quantities)

		Cooling				Heating						
		Main Sys.	Aux. Sys.	Opt. Vent	Cooling	Main Sys.	Aux. Sys.	Preheat	Reheat	Humidif.	Opt. Vent	Heating
System	System	Capacity	Capacity	Capacity	Totals	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity	Totals
Number	Type	(Tons)	(Tons)	(Tons)	(Tons)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)
	1 RAD	0.0	0.0	0.0	0.0	-50,656	0	0	0	0	0	-50,656
	2 SZ	1.7	0.0	0.0	1.7	-50,697	0	-146,077	0	0	0	-50,697
	Totals	1.7	0.0	0.0	1.7	-101,352	0	-146,077	0	0	0	-101,352

The building peaked at hour 19 month 7 with a capacity of 1.7 tons

ENGINEERING CHECKS - ALTERNATIVE 2
WALL & ROOF INSULATION

----- E N G I N E E R I N G C H E C K S -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	Cooling				Heating		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	RAD	0.00	0.00	0.0	0.0	0.00	0.00	-35.28	1,436
2	Main	SZ	10.00	3.73	6,206.6	1,664.3	7.21	3.73	-18.17	2,790

System 1 Block RAD - RADIATION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	-3,658	7.22
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-5,984	-5,984	11.81
Wall Cond	0	0		0	0.00	*	0	0.00	*	-5,776	-7,687	15.17
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	-33,326	-33,326	65.79
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-45,087	-50,655	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	-5,563	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-50,650	-50,655	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	AREAS Gross Total Floor	Glass (sf)	(%)
Main Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	1,436		
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0		
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	0.0	0.0				1,551	0	0
						2,279	144	6

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	AIRFLOWS (cfm) Cooling Heating	ENGINEERING CHECKS-- Clg % OA Clg Cfm/Sqft Clg Cfm/Ton Clg Btuh/Sqft No. People Htg % OA Htg Cfm/Sqft Htg Btuh/Sqft	TEMPERATURES (F)--- Type SADB Plenum Return Ret/OA Runarnd Fn MtrTD Fn BldTD Fn Frict	Clg 0.0 0.0 0.0 0 0.0 0.0 0.0	Htg 0 479 0 0 0 0 0 -35.28
Main Htg	-50.7	0	0.0	0.0	Vent	0				68.1
Aux Htg	0.0	0	0.0	0.0	Infil	0				61.3
Preheat	0.0	0	0.0	0.0	Supply	0				61.7
Reheat	0.0	0	0.0	0.0	Mincfm	0				61.7
Humidif	0.0	0	0.0	0.0	Return	0				68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0				0.0
Total	-50.7				Rm Exh	0				0.0
					Auxil	0				0.0

System 2 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/19 *
Outside Air ==> OADB/WB/HR: 85/ 70/ 91.0 * Mo/Hr: 7/19 *
OADB: 85 * Mo/Hr: 13/ 1 *
OADB: 4 *

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct	Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot	Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)	(Btuh)	(Btuh)	(%)
Envelope Loads											
Skylite Solr	0	0		0	0.00		0	0.00	0	0	0.00
Skylite Cond	0	0		0	0.00		0	0.00	0	0	0.00
Roof Cond	0	7,347		7,347	36.52		0	0.00	0	-7,603	15.06
Glass Solar	0	0		0	0.00		0	0.00	0	0	0.00
Glass Cond	0	0		0	0.00		0	0.00	0	0	0.00
Wall Cond	1,245	300		1,544	7.68		1,245	14.09	-3,780	-4,708	9.32
Partition	0			0	0.00		0	0.00	0	0	0.00
Exposed Floor	0			0	0.00		0	0.00	0	0	0.00
Infiltration	2,473			2,473	12.29		5,693	64.43	-37,178	-37,178	73.63
Sub Total==>	3,718	7,647		11,365	56.50		6,938	78.52	-40,958	-49,489	98.01
Internal Loads											
Lights	152	0		152	0.75		152	1.72	0	0	0.00
People	420			420	2.09		420	4.75	0	0	0.00
Misc	0	0	0	0	0.00		0	0.00	0	0	0.00
Sub Total==>	572	0	0	572	2.84		572	6.47	0	0	0.00
Ceiling Load	971	-971		0	0.00		973	11.01	-1,048	0	0.00
Outside Air	0	0	0	4,821	23.96		0	0.00	0	0	0.00
Sup. Fan Heat				3,699	18.39			0.00		0	0.00
Ret. Fan Heat		0		0	0.00			0.00		0	0.00
Duct Heat Pkwp		0		0	0.00			0.00		0	0.00
GV/UNDR Sizing	354			354	1.76		354	4.00	-1,007	-1,007	1.99
Exhaust Heat		-694	0	-694	-3.45			0.00		0	0.00
Terminal Bypass		0	0	0	0.00			0.00		0	0.00
Grand Total==>	5,614	5,982	0	20,116	100.00		8,836	100.00	-43,013	-50,496	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	AREAS
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor	Glass (sf) (%)
Main Clg	1.7	20.1	10,405	76.5 69.3 98.9	73.9 68.8 100.3	2,790	
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0	
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0	
Totals	1.7	20.1				2,918	0 0
						2,542	0 0

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	ENGINEERING CHECKS--	TEMPERATURES (F)---
	(Mbh)	(cfm)	Deg F	Deg F	Vent			Clg % OA 10.0	Type Clg Htg
Main Htg	-50.7	10,405	67.3	71.8	Infil	534	534	Clg Cfm/Sqft 3.73	SADB 74.2 71.8
Aux Htg	0.0	0	0.0	0.0	Supply	10,405	10,405	Clg Cfm/Ton 6206.58	Plenum 75.6 67.3
Preheat	-146.1	10,405	61.0	73.9	Mincfm	0	0	Clg Btuh/Sqft 7.21	Return 75.6 67.3
Reheat	0.0	0	0.0	0.0	Return	10,405	10,405	No. People 200	Ret/OA 76.5 67.3
Humidif	0.0	0	0.0	0.0	Exhaust	1,040	0	Htg % OA 0.0	Runarnd 75.0 68.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/SqFt 3.73	Fn MtrTD 0.1 0.0
Total	-50.7				Auxil	0	0	Htg Btuh/SqFt -18.17	Fn Frict 0.2 0.0

BUILDING U-VALUES - ALTERNATIVE 2
WALL & ROOF INSULATION

----- B U I L D I N G U - V A L U E S -----

Room Number	Description	Room U-Values (Btu/hr/sqft/F)									Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
		Part.	ExFlr	Summr Skylt	Wintr Skylt	Roof	Summr Windo	Wintr Windo	Wall	Ceil.		
1	MANAGERS OFFICE	0.000	0.000	0.000	0.000	0.041	0.580	0.594	0.058	0.568	192.8	45.45
2	LOBBY	0.000	0.000	0.000	0.000	0.041	0.650	0.668	0.058	0.568	114.3	28.42
3	LOUNGE	0.000	0.000	0.000	0.000	0.041	0.580	0.594	0.058	0.568	246.9	57.33
4	MENS TOILET	0.000	0.000	0.000	0.000	0.041	0.580	0.594	0.058	0.568	239.7	55.72
5	WOMENS TOILET	0.000	0.000	0.000	0.000	0.041	0.000	0.000	0.000	0.568	15.1	6.48
Zone 1	Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.633	0.650	0.058	0.568	166.3	39.72
8	STAGE	0.000	0.000	0.000	0.000	0.041	0.000	0.000	0.058	0.568	252.0	58.33
Zone 3	Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.000	0.000	0.058	0.568	252.0	58.33
System 1	Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.633	0.650	0.058	0.568	215.7	50.45
6	FOYER & HALLWAYS	0.000	0.000	0.000	0.000	0.041	0.000	0.000	0.029	0.568	65.6	16.54
7	AUDITORIUM	0.000	0.000	0.000	0.000	0.041	0.000	0.000	0.029	0.568	50.8	13.57
Zone 2	Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.000	0.000	0.029	0.568	52.5	13.92
System 2	Total/Ave.	0.000	0.000	0.000	0.000	0.041	0.000	0.000	0.029	0.568	52.5	13.92
Building		0.000	0.000	0.000	0.000	0.041	0.633	0.650	0.042	0.568	108.0	26.33

BUILDING AREAS - ALTERNATIVE 2
WALL & ROOF INSULATION

----- B U I L D I N G A R E A S -----

Room Number	Description	Number of Duplicate		Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed		Skl Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
		Flr	Rm				Floor Area (sqft)	Skylight Area (sqft)						
1	MANAGERS OFFICE	1	1	200	200	0	0	0	0	0	225	18	6	263
2	LOBBY	1	1	214	214	0	0	0	0	0	294	109	42	153
3	LOUNGE	1	1	114	114	0	0	0	0	0	128	9	4	195
4	MENS TOILET	1	1	39	39	0	0	0	0	0	43	9	12	65
5	WOMENS TOILET	1	1	41	41	0	0	0	0	0	45	0	0	0
Zone 1	Total/Ave.				608	0	0	0	0	0	735	144	18	677
8	STAGE	1	1	828	828	0	0	0	0	0	816	0	0	1,458
Zone 3	Total/Ave.				828	0	0	0	0	0	816	0	0	1,458
System 1	Total/Ave.				1,436	0	0	0	0	0	1,551	144	6	2,135
6	FOYER & HALLWAYS	1	1	329	329	0	0	0	0	0	350	0	0	402
7	AUDITORIUM	1	1	2,461	2,461	0	0	0	0	0	2,568	0	0	2,140
Zone 2	Total/Ave.				2,790	0	0	0	0	0	2,918	0	0	2,542
System 2	Total/Ave.				2,790	0	0	0	0	0	2,918	0	0	2,542
Building					4,226	0	0	0	0	0	4,469	144	3	4,677

ASHRAE 90 ANALYSIS - ALTERNATIVE 2
WALL & ROOF INSULATION

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.041 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.060 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.051 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 2.27 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTVw) = 4.03 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2
WALL & ROOF INSULATION

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.1	0	0	-12,371	0	5	520.2	0	0	0.0	0	0
5 - 10	0.2	0	0	-24,743	0	11	1,040.5	0	0	0.0	0	0
10 - 15	0.3	0	0	-37,114	0	11	1,560.7	0	0	0.0	0	0
15 - 20	0.3	0	0	-49,486	8	282	2,080.9	0	0	0.0	0	0
20 - 25	0.4	0	0	-61,857	13	461	2,601.1	0	0	0.0	0	0
25 - 30	0.5	0	0	-74,229	15	538	3,121.4	0	0	0.0	0	0
30 - 35	0.6	0	0	-86,600	17	620	3,641.6	0	0	0.0	0	0
35 - 40	0.7	0	0	-98,972	13	473	4,161.8	0	0	0.0	0	0
40 - 45	0.8	0	0	-111,343	34	1,258	4,682.0	0	0	0.0	0	0
45 - 50	0.8	0	0	-123,715	0	0	5,202.3	71	6,205	0.0	0	0
50 - 55	0.9	0	0	-136,086	0	0	5,722.5	0	0	0.0	0	0
55 - 60	1.0	3	5	-148,458	0	0	6,242.7	0	0	0.0	0	0
60 - 65	1.1	0	0	-160,829	0	0	6,763.0	0	0	0.0	0	0
65 - 70	1.2	0	0	-173,200	0	0	7,283.2	0	0	0.0	0	0
70 - 75	1.3	0	0	-185,572	0	0	7,803.4	0	0	0.0	0	0
75 - 80	1.3	0	0	-197,943	0	0	8,323.6	0	0	0.0	0	0
80 - 85	1.4	0	0	-210,315	0	0	8,843.9	0	0	0.0	0	0
85 - 90	1.5	3	5	-222,686	0	0	9,364.1	0	0	0.0	0	0
90 - 95	1.6	0	0	-235,058	0	0	9,884.3	0	0	0.0	0	0
95 - 100	1.7	94	150	-247,429	0	0	10,404.5	29	2,555	0.0	0	0
Hours Off	0.0	0	8,600	0	0	5,101	0.0	0	0	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2
WALL & ROOF INSULATION

----- BUILDING TEMPERATURE PROFILES -----

Temperature	----- Zone Number -----		
Range	1	3	2
(F)			

Max. Temp.	106.0	89.0	86.1
Mo./Hr.	9 20	11 24	7 24
Day Type	1	2	4

	..... Number of Hours		
Above 100	2,208	0	0
95 - 100	1,406	0	0
90 - 95	1,531	0	0
85 - 90	1,102	383	76
80 - 85	815	4,757	1,212
75 - 80	828	1,111	1,582
70 - 75	511	1,115	1,613
65 - 70	342	1,128	2,513
60 - 65	17	266	1,041
55 - 60	0	0	506
50 - 55	0	0	217
Below 50	0	0	0

Min. Temp.	64.3	61.0	50.1
Mo./Hr.	1 11	2 24	2 18
Day Type	1	4	4

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2
WALL & ROOF INSULATION

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	HOT WTR	HOT W DMND
	Off Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	1,175	4	518	1
Feb	1,062	4	478	1
March	1,176	4	509	1
April	1,137	4	331	1
May	1,190	4	0	0
June	1,213	4	0	0
July	1,281	4	0	0
Aug	1,251	4	0	0
Sept	1,159	4	0	0
Oct	1,176	4	287	1
Nov	1,137	4	360	1
Dec	1,175	4	485	1
Total	14,133	4	2,968	1

Building Energy Consumption = 81,647 (Btu/Sq Ft/Year)
Source Energy Consumption = 127,890 (Btu/Sq Ft/Year)

Floor Area = 4,226 (Sq Ft)

----- EQUIPMENT ENERGY CONSUMPTION

[illegible]

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2
WALL & ROOF INSULATION

ELEC	3	3	3	3	0	0	0	0	0	3	3	3
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

21
0.0

UTILITY PEAK CHECKSUMS - ALTERNATIVE 2
WALL & ROOF INSULATION

----- UTILITY PEAK CHECKSUMS -----

Utility ELECTRIC DEMAND

Peak Value 4.5 (kW)
Yearly Time of Peak 18 (hr) 7 (mo)

Hour 18 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Percent Of Tot (%)
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Cooling Equipment

1	EQ1170L	AIR-CLD COND COMP >20 TONS	2.1	47.07
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Sub Total			2.1	47.07
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Sub Total			0.0	0.00
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Air Moving Equipment

2		SUMMATION OF FAN ELECTRICAL DEMAND	2.2	49.79
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Sub Total			2.2	49.79
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Sub Total			0.0	0.00
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Miscellaneous

Lights			0.1	3.14
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Base Utilities			0.0	0.00
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Misc Equipment			0.0	0.00
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Sub Total			0.1	3.14
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Grand Total			4.5	100.00
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Building 122
Trace Input File

933702

CONTENTS OF : C:\JOBS\CB122.TM

LINE # -----

1 JOB - 1
2 01/ENERGY SAVINGS OPPORTUNITY STUDY
3 01/CARLISLE BARRACKS, PA
4 01/DEPARTMENT OF THE ARMY
5 01/BENATEC ASSOCIATES
6 01/BUILDING 122
7 08/CARLISLE
8 09/MAY/SEP///APR/OCT
9 10/CLTD-CLF
10 11///ZONE
11 LOAD - 1
12 19/1/BASE BUILDING
13 20/1/1/SUB BSMT, BSMT W/1/45125/4/1//10
14 20/2/2/TOILETS, KITCHEN/1/3520/4/2//11
15 20/3/3/STAIRS/1/560/4/0//11
16 20/4/4/BSMT E/1/12424/4/3.3//12.7
17 20/5/5/1ST FL OFFICES/1/11724/4/1.3//12
18 20/6/6/1ST FL CEN OFFCS/1/9884/4/1.3//12
19 20/7/7/2ND FL OFFICES/1/14400/4/1.3//10.7
20 20/8/8/2ND FL CEN OFFCS/1/8674/4/0//10.7
21 20/9/9/3RD FL OFFICES/1/14400/4/1.3//11
22 20/10/10/3RD FL CEN OFFCS/1/8563/4/0//11
23 20/11/11/TOILETS W ROOF/1/580/4/2//11
24 20/12/12/STAIRS W ROOF/1/280/4/0//11
25 20/13/13/SUPPLY STORAGE/1/2544/4/0//12.7
26 20/14/14/1ST FL CEN OFFCS/9884/1/4/1.3//12
27 20/15/15/2ND FL CEN OFFCS/8674/1/4/0//10.7
28 20/16/16/3RD FL CEN OFFCS/8563/1/4/0//11
29 21/M///CBADCTX///CBADHTX
30 22/9/1/YES///14
31 22/10/1/YES///14
32 22/11/1/YES///14
33 22/12/1/YES///14
34 22/16/1/YES///14
35 24/2/1/9/10.3//134/45
36 24/2/2/10/10.3//134/315
37 24/3/1/16/11//135/45
38 24/3/2/48/11//135/135
39 24/3/3/16/11//135/225
40 24/5/1/108/11.3//134/45
41 24/5/2/281/11.3//134/135
42 24/5/3/93/11.3//134/225
43 24/5/4/235/11.3//134/315
44 24/6/1/9/11.3//134/45
45 24/6/2/27/11.3//134/135
46 24/6/3/22/11.3//134/225
47 24/6/4/56/11.3//134/315
48 24/7/1/135/10//134/45
49 24/7/2/320/10//134/135
50 24/7/3/135/10//134/225
51 24/7/4/344/10//134/315
52 24/8/1/8/10//134/135
53 24/8/2/8/10//134/315
54 24/9/1/135/10.3//134/45
55 24/9/2/320/10.3//134/135
56 24/9/3/135/10.3//134/225
57 24/9/4/344/10.3//134/315
58 24/10/1/8/10.3//134/135

LINE # -----

59 24/10/2/8/10.3//134/315
60 24/12/1/8/10.3//135/45
61 24/12/2/24/10.3//135/135
62 24/12/3/8/10.3//135/225
63 24/14/1/9/11.3//134/45
64 24/14/2/27/11.3//134/135
65 24/14/3/22/11.3//134/225
66 24/14/4/56/11.3//134/315
67 24/15/1/8/10//134/135
68 24/15/2/8/10//134/315
69 24/16/1/8/10.3//134/135
70 24/16/2/8/10.3//134/315
71 25/2/1/8.5/2.5/1/.81/.64
72 25/3/1/8.5/2.5/6/.81/.64
73 25/3/3/8.5/2.5/6/.81/.64
74 25/5/1/8.5/2.5/5/.81/.64
75 25/5/2/8.5/2.5/35/.81/.64
76 25/5/3/8.5/2.5/6/.81/.64
77 25/5/4/8.5/2.5/28/.81/.64
78 25/6/1/8.5/2.5/5/.81/.64
79 25/6/2/8.5/2.5/7/.81/.64
80 25/7/1/7/2.5/6/.81/.64
81 25/7/2/7/2.5/40/.81/.64
82 25/7/3/7/2.5/6/.81/.64
83 25/7/4/7/2.5/40/.81/.64
84 25/8/1/7/2.5/3/.81/.64
85 25/8/2/7/2.5/3/.81/.64
86 25/9/1/7/2.5/6/.81/.64
87 25/9/2/7/2.5/40/.81/.64
88 25/9/3/7/2.5/6/.81/.64
89 25/9/4/7/2.5/40/.81/.64
90 25/10/1/7/2.5/3/.81/.64
91 25/10/2/7/2.5/3/.81/.64
92 25/12/1/7/2.5/3/.81/.64
93 25/12/3/7/2.5/3/.81/.64
94 25/14/1/8.5/2.5/5/.81/.64
95 25/14/2/8.5/2.5/7/.81/.64
96 25/15/1/7/2.5/3/.81/.64
97 25/15/2/7/2.5/3/.81/.64
98 25/16/1/7/2.5/3/.81/.64
99 25/16/2/7/2.5/3/.81/.64
100 26/1/CBAP&L/CBAP&L/CBAPFAN/OFF/CBAPFAN/CBAPFAN/OFF/OFF/OFF/OFF
101 26/2/CBAP&L/CBAP&L/OFF/AVAIL/CBAPFAN/OFF/OFF/OFF/CBAPFAN/OFF
102 26/3/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
103 26/4/CBAP&L/CBAP&L/CBAPFAN/OFF/CBAPFAN/CBAPFAN/OFF/OFF/OFF/OFF
104 26/5/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
105 26/6/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
106 26/7/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
107 26/8/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
108 26/9/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
109 26/10/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
110 26/11/CBAP&L/CBAP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/CBAPFAN/OFF
111 26/12/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
112 26/13/CBAP&L/CBAP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/OFF/OFF
113 26/14/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
114 26/15/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
115 26/16/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
116 27/4/420/SF-PERS/255/255/2.57/WATT-SF/ASHRAE2

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LINE # -----

117 29/1/30/PCT-MCLG/30/PCT-MHTG/0//0

118 29/2/0/PCT-MCLG/0/PCT-MHTG/0//0

119 29/3/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

120 29/4/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

121 29/5/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

122 29/6/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG

123 29/7/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

124 29/8/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG

125 29/9/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

126 29/10/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG

127 29/11/0/PCT-MCLG/0/PCT-MHTG/0/CFM-SF/0/CFM-SF

128 29/12/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

129 29/13/0/PCT-MCLG/0/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

130 29/14/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

131 29/15/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

132 29/16/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

133 30/1/23725/CFM/23725/CFM

134 30/2/14660/CFM/14660/CFM/////14660/CFM

135 30/3/360/CFM/360/CFM

136 30/4/12450/CFM/12450/CFM

137 30/5/5505/CFM/5505/CFM

138 30/6/10028/CFM/10028/CFM

139 30/7/6535/CFM/6535/CFM

140 30/8/8914/CFM/8914/CFM

141 30/9/6855/CFM/6855/CFM

142 30/10/8914/CFM/8914/CFM

143 30/11/3070/CFM/3070/CFM/////3070/CFM

144 30/12/180/CFM/180/CFM

145 30/13/0/CFM/1835/CFM

146 30/14/10028/CFM/10028/CFM

147 30/15/8914/CFM/8914/CFM

148 30/16/8914/CFM/8914/CFM

149 31/1/1/535/10//135/SINE-FIT/80/50

150 31/1/2/656/12//135/SINE-FIT/80/50

151 31/4/1/279/12//135/SINE-FIT/80/50

152 31/13/1/136/12//135/SINE-FIT/80/50

153 SYSTEM - 1

154 39/1/BASE BUILDING

155 40/1/TRH/ROADK

156 41/1/1/1/4/4

157 42/1/3/3/.65

158 44/1

159 45/1/CBADCLG/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/CBADHTG/CBADFAN/OFF

160 40/2/SZ

161 41/2/2/2/11/11

162 42/2////.75//.75

163 44/2

164 45/2/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

165 40/3/INDFP

166 41/3/3/3/5/5/7/7/9/9/12/12

167 42/3/8/8/1

168 44/3/DRY-BULB/65/100

169 45/3/CBADCLG/CBADCLG/OFF/OFF/CBADCLG/OFF/CBADHTG/OFF/CBADFAN/CBADHTG

170 40/4/UH

171 41/4/13/13

172 42/4/.20

173 44/4

174 45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF

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LINE # -----

175 40/5/DD

176 41/5/6/6/8/8/10/10

177 42/5/8/8/1

178 44/5/DRY-BULB/65/100

179 45/5/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF

180 40/6/DD

181 41/6/14/16

182 42/6/8/8/1

183 45/6/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF

184 EQUIPMENT - 1

185 59/1/CARLISLE///BASE BUILDING

186 60/1/1/BLKPLANT/1/1/3/3/5/6

187 60/2/2/BLKPLANT/2/2

188 62/1/EQ1001S/2/306/TONS

189 62/2/EQ1000

190 63/1/30/HP/30/HP/////1

191 65/1/1/1/1/3/3/5/6

192 65/2/2/1/1/3/6

193 65/3/3/2/2

194 66/1/1

195 66/2/2/2

196 67/1/EQ2101/1/30/HP/11874/MBH/2156/KW

197 67/2/EQ2101/1/25/HP/2620/MBH/2300/KW

198 67/3/EQ2000

199 69/1/EQ4003//EQ4003

200 69/2/////EQ4003

201 69/3/EQ4003//EQ4003

202 69/4

203 69/5/EQ4003//EQ4003

204 69/6/EQ4003//EQ4003

205 74/1/EQ5100/750/TONS/.031/KW-TON/T-WATER/CTOWER/2/50/50/PERCENT

206 LOAD - 2

207 19/2/DOUBLE GLAZED WINDOWS

208 20/1/1/SUB BSMT, BSMT W/1/45125/4/1//10

209 20/2/2/TOILETS, KITCHEN/1/3520/4/2//11

210 20/3/3/STAIRS/1/560/4/0//11

211 20/4/4/BSMT E/1/12424/4/3.3//12.7

212 20/5/5/1ST FL OFFICES/1/11724/4/1.3//12

213 20/6/6/1ST FL CEN OFFCS/1/9884/4/1.3//12

214 20/7/7/2ND FL OFFICES/1/14400/4/1.3//10.7

215 20/8/8/2ND FL CEN OFFCS/1/8674/4/0//10.7

216 20/9/9/3RD FL OFFICES/1/14400/4/1.3//11

217 20/10/10/3RD FL CEN OFFCS/1/8563/4/0//11

218 20/11/11/TOILETS W ROOF/1/580/4/2//11

219 20/12/12/STAIRS W ROOF/1/280/4/0//11

220 20/13/13/SUPPLY STORAGE/1/2544/4/0//12.7

221 20/14/14/1ST FL CEN OFFCS/9884/1/4/1.3//12

222 20/15/15/2ND FL CEN OFFCS/8674/1/4/0//10.7

223 20/16/16/3RD FL CEN OFFCS/8563/1/4/0//11

224 21/M///CBADCTX///CBADHTX

225 22/9/1/YES////14

226 22/10/1/YES////14

227 22/11/1/YES////14

228 22/12/1/YES////14

229 22/16/1/YES////14

230 24/2/1/9/10.3//134/45

231 24/2/2/10/10.3//134/315

232 24/3/1/16/11//135/45

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LINE #	
233	24/3/2/48/11//135/135
234	24/3/3/16/11//135/225
235	24/5/1/108/11.3//134/45
236	24/5/2/281/11.3//134/135
237	24/5/3/93/11.3//134/225
238	24/5/4/235/11.3//134/315
239	24/6/1/9/11.3//134/45
240	24/6/2/27/11.3//134/135
241	24/6/3/22/11.3//134/225
242	24/6/4/56/11.3//134/315
243	24/7/1/135/10//134/45
244	24/7/2/320/10//134/135
245	24/7/3/135/10//134/225
246	24/7/4/344/10//134/315
247	24/8/1/8/10//134/135
248	24/8/2/8/10//134/315
249	24/9/1/135/10.3//134/45
250	24/9/2/320/10.3//134/135
251	24/9/3/135/10.3//134/225
252	24/9/4/344/10.3//134/315
253	24/10/1/8/10.3//134/135
254	24/10/2/8/10.3//134/315
255	24/12/1/8/10.3//135/45
256	24/12/2/24/10.3//135/135
257	24/12/3/8/10.3//135/225
258	24/14/1/9/11.3//134/45
259	24/14/2/27/11.3//134/135
260	24/14/3/22/11.3//134/225
261	24/14/4/56/11.3//134/315
262	24/15/1/8/10//134/135
263	24/15/2/8/10//134/315
264	24/16/1/8/10.3//134/135
265	24/16/2/8/10.3//134/315
266	25/2/1/8.5/2.5/1/.55/.57
267	25/3/1/8.5/2.5/6/.55/.57
268	25/3/3/8.5/2.5/6/.55/.57
269	25/5/1/8.5/2.5/5/.55/.57
270	25/5/2/8.5/2.5/35/.55/.57
271	25/5/3/8.5/2.5/6/.55/.57
272	25/5/4/8.5/2.5/28/.55/.57
273	25/6/1/8.5/2.5/5/.55/.57
274	25/6/2/8.5/2.5/7/.55/.57
275	25/7/1/7/2.5/6/.55/.57
276	25/7/2/7/2.5/40/.55/.57
277	25/7/3/7/2.5/6/.55/.57
278	25/7/4/7/2.5/40/.55/.57
279	25/8/1/7/2.5/3/.55/.57
280	25/8/2/7/2.5/3/.55/.57
281	25/9/1/7/2.5/6/.55/.57
282	25/9/2/7/2.5/40/.55/.57
283	25/9/3/7/2.5/6/.55/.57
284	25/9/4/7/2.5/40/.55/.57
285	25/10/1/7/2.5/3/.55/.57
286	25/10/2/7/2.5/3/.55/.57
287	25/12/1/7/2.5/3/.55/.57
288	25/12/3/7/2.5/3/.55/.57
289	25/14/1/8.5/2.5/5/.55/.57
290	25/14/2/8.5/2.5/7/.55/.57

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LINE # -----

291 25/15/1/7/2.5/3/.55/.57
292 25/15/2/7/2.5/3/.55/.57
293 25/16/1/7/2.5/3/.55/.57
294 25/16/2/7/2.5/3/.55/.57
295 26/1/CBAPD&L/CBAPD&L/CBADFAN/OFF/CBADFAN/CBADFAN/OFF/OFF/OFF/OFF
296 26/2/CBAPD&L/CBAPD&L/OFF/AVAIL/CBADFAN/OFF/OFF/OFF/CBADFAN/OFF
297 26/3/CBAPD&L/CBAPD&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
298 26/4/CBAPD&L/CBAPD&L/CBADFAN/OFF/CBADFAN/CBADFAN/OFF/OFF/OFF/OFF
299 26/5/CBAPD&L/CBAPD&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
300 26/6/CBAPD&L/CBAPD&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
301 26/7/CBAPD&L/CBAPD&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
302 26/8/CBAPD&L/CBAPD&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
303 26/9/CBAPD&L/CBAPD&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
304 26/10/CBAPD&L/CBAPD&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
305 26/11/CBAPD&L/CBAPD&L/OFF/AVAIL/OFF/OFF/OFF/OFF/CBADFAN/OFF
306 26/12/CBAPD&L/CBAPD&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
307 26/13/CBAPD&L/CBAPD&L/OFF/AVAIL/OFF/OFF/OFF/OFF/OFF
308 26/14/CBAPD&L/CBAPD&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
309 26/15/CBAPD&L/CBAPD&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
310 26/16/CBAPD&L/CBAPD&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF
311 27/M/420/SF-PERS/255/255/2.57/WATT-SF/ASHRAE2
312 29/1/30/PCT-MCLG/30/PCT-MHTG/0/0
313 29/2/0/PCT-MCLG/0/PCT-MHTG/0/0
314 29/3/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF
315 29/4/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF
316 29/5/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF
317 29/6/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF/50/PCT-MCLG
318 29/7/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF
319 29/8/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF/50/PCT-MCLG
320 29/9/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF
321 29/10/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF/50/PCT-MCLG
322 29/11/0/PCT-MCLG/0/PCT-MHTG/0/CFM-SF/0/CFM-SF
323 29/12/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF
324 29/13/0/PCT-MCLG/0/PCT-MHTG/.53/CFM-SF/.53/CFM-SF
325 29/14/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF
326 29/15/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF
327 29/16/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF
328 30/1/23725/CFM/23725/CFM
329 30/2/14600/CFM/14600/CFM/////14660/CFM
330 30/3/360/CFM/360/CFM
331 30/4/12450/CFM/12450/CFM
332 30/5/5505/CFM/5505/CFM
333 30/6/10028/CFM/10028/CFM
334 30/7/6535/CFM/6535/CFM
335 30/8/8914/CFM/8914/CFM
336 30/9/6855/CFM/6855/CFM
337 30/10/8914/CFM/8914/CFM
338 30/11/3070/CFM/3070/CFM/////3070/CFM
339 30/12/180/CFM/180/CFM
340 30/13/0/CFM/1835/CFM
341 30/14/10028/CFM/10028/CFM
342 30/15/8914/CFM/8914/CFM
343 30/16/8914/CFM/8914/CFM
344 31/1/1/535/10//135/SINE-FIT/80/50
345 31/1/2/656/12//135/SINE-FIT/80/50
346 31/4/1/279/12//135/SINE-FIT/80/50
347 31/13/1/136/12//135/SINE-FIT/80/50
348 SYSTEM - 2

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LINE #	
349	39/2/BOUBLE GLAZED WINDOWS
350	40/1/TRH/ROADK
351	41/1/1/1/4/4
352	42/1/3/3/.65
353	44/1
354	45/1/CBADCLG/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/CBADHTG/CBADFAN/OFF
355	40/2/SZ
356	41/2/2/2/11/11
357	42/2///.75//.75
358	44/2
359	45/2/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
360	40/3/INDFP
361	41/3/3/3/5/5/7/7/9/9/12/12
362	42/3/8/8/1
363	44/3/DRY-BULB/65/100
364	45/3/CBADCLG/CBADCLG/OFF/OFF/CBADCLG/OFF/CBADHTG/OFF/CBADFAN/CBADHTG
365	40/4/UH
366	41/4/13/13
367	42/4/.20
368	44/4
369	45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
370	40/5/DD
371	41/5/6/6/8/8/10/10
372	42/5/8/8/1
373	44/5/DRY-BULB/65/100
374	45/5/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF
375	40/6/DD
376	41/6/14/16
377	42/6/8/8/1
378	45/6/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF
379	EQUIPMENT - 2
380	59/2/CARLISLE///DOUBLE GLAZED WINDOWS
381	60/1/1/BLKPLANT/1/1/3/3/5/6
382	60/2/2/BLKPLANT/2/2
383	62/1/EQ1001S/2/306/TONS
384	62/2/EQ1000
385	63/1/30/HP/30/HP/////1
386	65/1/1/1/1/3/3/5/6
387	65/2/2/1/1/3/6
388	65/3/3/2/2
389	66/1/1
390	66/2/2/2
391	67/1/EQ2101/1/30/HP/11874/MBH/2156/KW
392	67/2/EQ2101/1/25/HP/2620/MBH/2300/KW
393	67/3/EQ2000
394	69/1/EQ4003//EQ4003
395	69/2/////EQ4003
396	69/3/EQ4003//EQ4003
397	69/4
398	69/5/EQ4003//EQ4003
399	69/6/EQ4003//EQ4003
400	74/1/EQ5100/750/TONS/.031/KW-TON/T-WATER/CTOWER/2/50/50/PERCENT
401	LOAD - 3
402	19/3/WEATHERSTRIP & CAULKING
403	20/1/1/SUB BSMT, BSMT W/1/45125/4/1//10
404	20/2/2/TOILETS, KITCHEN/1/3520/4/2//11
405	20/3/3/STAIRS/1/560/4/0//11
406	20/4/4/BSMT E/1/12424/4/3.3//12.7

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LINE #	
407	20/5/5/1ST FL OFFICES/1/11724/4/1.3//12
408	20/6/6/1ST FL CEN OFFCS/1/9884/4/1.3//12
409	20/7/7/2ND FL OFFICES/1/14400/4/1.3//10.7
410	20/8/8/2ND FL CEN OFFCS/1/8674/4/0//10.7
411	20/9/9/3RD FL OFFICES/1/14400/4/1.3//11
412	20/10/10/3RD FL CEN OFFCS/1/8563/4/0//11
413	20/11/11/TOILETS W ROOF/1/580/4/2//11
414	20/12/12/STAIRS W ROOF/1/280/4/0//11
415	20/13/13/SUPPLY STORAGE/1/2544/4/0//12.7
416	20/14/14/1ST FL CEN OFFCS/9884/1/4/1.3//12
417	20/15/15/2ND FL CEN OFFCS/8674/1/4/0//10.7
418	20/16/16/3RD FL CEN OFFCS/8563/1/4/0//11
419	21/M///CBADCTX///CBADHTX
420	22/9/1/YES////14
421	22/10/1/YES////14
422	22/11/1/YES////14
423	22/12/1/YES////14
424	22/16/1/YES////14
425	24/2/1/9/10.3//134/45
426	24/2/2/10/10.3//134/315
427	24/3/1/16/11//135/45
428	24/3/2/48/11//135/135
429	24/3/3/16/11//135/225
430	24/5/1/108/11.3//134/45
431	24/5/2/281/11.3//134/135
432	24/5/3/93/11.3//134/225
433	24/5/4/235/11.3//134/315
434	24/6/1/9/11.3//134/45
435	24/6/2/27/11.3//134/135
436	24/6/3/22/11.3//134/225
437	24/6/4/56/11.3//134/315
438	24/7/1/135/10//134/45
439	24/7/2/320/10//134/135
440	24/7/3/135/10//134/225
441	24/7/4/344/10//134/315
442	24/8/1/8/10//134/135
443	24/8/2/8/10//134/315
444	24/9/1/135/10.3//134/45
445	24/9/2/320/10.3//134/135
446	24/9/3/135/10.3//134/225
447	24/9/4/344/10.3//134/315
448	24/10/1/8/10.3//134/135
449	24/10/2/8/10.3//134/315
450	24/12/1/8/10.3//135/45
451	24/12/2/24/10.3//135/135
452	24/12/3/8/10.3//135/225
453	24/14/1/9/11.3//134/45
454	24/14/2/27/11.3//134/135
455	24/14/3/22/11.3//134/225
456	24/14/4/56/11.3//134/315
457	24/15/1/8/10//134/135
458	24/15/2/8/10//134/315
459	24/16/1/8/10.3//134/135
460	24/16/2/8/10.3//134/315
461	25/2/1/8.5/2.5/1/.81/.64
462	25/3/1/8.5/2.5/6/.81/.64
463	25/3/3/8.5/2.5/6/.81/.64
464	25/5/1/8.5/2.5/5/.81/.64

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LINE #	
465	25/5/2/8.5/2.5/35/.81/.64
466	25/5/3/8.5/2.5/6/.81/.64
467	25/5/4/8.5/2.5/28/.81/.64
468	25/6/1/8.5/2.5/5/.81/.64
469	25/6/2/8.5/2.5/7/.81/.64
470	25/7/1/7/2.5/6/.81/.64
471	25/7/2/7/2.5/40/.81/.64
472	25/7/3/7/2.5/6/.81/.64
473	25/7/4/7/2.5/40/.81/.64
474	25/8/1/7/2.5/3/.81/.64
475	25/8/2/7/2.5/3/.81/.64
476	25/9/1/7/2.5/6/.81/.64
477	25/9/2/7/2.5/40/.81/.64
478	25/9/3/7/2.5/6/.81/.64
479	25/9/4/7/2.5/40/.81/.64
480	25/10/1/7/2.5/3/.81/.64
481	25/10/2/7/2.5/3/.81/.64
482	25/12/1/7/2.5/3/.81/.64
483	25/12/3/7/2.5/3/.81/.64
484	25/14/1/8.5/2.5/5/.81/.64
485	25/14/2/8.5/2.5/7/.81/.64
486	25/15/1/7/2.5/3/.81/.64
487	25/15/2/7/2.5/3/.81/.64
488	25/16/1/7/2.5/3/.81/.64
489	25/16/2/7/2.5/3/.81/.64
490	26/1/CBAP&L/CBAP&L/CBAP&L/OFF/CBAP&L/CBAP&L/OFF/OFF/OFF/OFF
491	26/2/CBAP&L/CBAP&L/OFF/AVAIL/CBAP&L/OFF/OFF/OFF/CBAP&L/OFF
492	26/3/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF
493	26/4/CBAP&L/CBAP&L/CBAP&L/OFF/CBAP&L/CBAP&L/OFF/OFF/OFF/OFF
494	26/5/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF
495	26/6/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF
496	26/7/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF
497	26/8/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF
498	26/9/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF
499	26/10/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF
500	26/11/CBAP&L/CBAP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/CBAP&L/OFF
501	26/12/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF
502	26/13/CBAP&L/CBAP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/OFF/OFF
503	26/14/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF
504	26/15/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF
505	26/16/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF
506	27/M/420/SF-PERS/255/255/2.57/WATT-SF/ASHRAE2
507	29/1/30/PCT-MCLG/30/PCT-MHTG/0/0
508	29/2/0/PCT-MCLG/0/PCT-MHTG/0/0
509	29/3/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF
510	29/4/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF
511	29/5/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF
512	29/6/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF/50/PCT-MCLG
513	29/7/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF
514	29/8/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF/50/PCT-MCLG
515	29/9/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF
516	29/10/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF/50/PCT-MCLG
517	29/11/0/PCT-MCLG/0/PCT-MHTG/0/CFM-SF/0/CFM-SF
518	29/12/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF
519	29/13/0/PCT-MCLG/0/PCT-MHTG/.54/CFM-SF/.54/CFM-SF
520	29/14/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF
521	29/15/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF
522	29/16/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF

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LINE # -----

523 30/1/23725/CFM/23725/CFM

524 30/2/14660/CFM/14660/CFM/////14660/CFM

525 30/3/360/CFM/360/CFM

526 30/4/12450/CFM/12450/CFM

527 30/5/5505/CFM/5505/CFM

528 30/6/10028/CFM/10028/CFM

529 30/7/6535/CFM/6535/CFM

530 30/8/8924/CFM/8924/CFM

531 30/9/6855/CFM/6855/CFM

532 30/10/8924/CFM/8924/CFM

533 30/11/3070/CFM/3070/CFM/////3070/CFM

534 30/12/180/CFM/180/CFM

535 30/13/0/CFM/1835/CFM

536 30/14/10028/CFM/10028/CFM

537 30/15/8914/CFM/8914/CFM

538 30/16/8914/CFM/8914/CFM

539 31/1/1/535/10//135/SINE-FIT/80/50

540 31/1/2/656/12//135/SINE-FIT/80/50

541 31/4/1/279/12//135/SINE-FIT/80/50

542 31/13/1/136/12//135/SINE-FIT/80/50

543 SYSTEM - 3

544 39/3/WEATHERSTRIP & CAULKING

545 40/1/TRH/ROADK

546 41/1/1/1/4/4

547 42/1/3/3/.65

548 44/1

549 45/1/CBADCLG/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/CBADHTG/CBADFAN/OFF

550 40/2/SZ

551 41/2/2/2/11/11

552 42/2////.75//.75

553 44/2

554 45/2/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

555 40/3/INDFP

556 41/3/3/3/5/5/7/7/9/9/12/12

557 42/3/8/8/1

558 44/3/DRY-BULB/65/100

559 45/3/CBADCLG/CBADCLG/OFF/OFF/CBADCLG/OFF/CBADHTG/OFF/CBADFAN/CBADHTG

560 40/4/UH

561 41/4/13/13

562 42/4/.20

563 44/4

564 45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF

565 40/5/DD

566 41/5/6/6/8/8/10/10

567 42/5/8/8/1

568 44/5/DRY-BULB/65/100

569 45/5/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF

570 40/6/DD

571 41/6/14/16

572 42/6/8/8/1

573 45/6/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF

574 EQUIPMENT - 3

575 59/3/CARLISLE///WEATHERSTRIP & CAULKING

576 60/1/1/BLKPLANT/1/1/3/3/5/6

577 60/2/2/BLKPLANT/2/2

578 62/1/EQ1001S/2/306/TONS

579 62/2/EQ1000

580 63/1/30/HP/30/HP/////1

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LINE # -----

581 65/1/1/1/1/3/5/6

582 65/2/2/1/1/3/6

583 65/3/3/2/2

584 66/1/1

585 66/2/2/2

586 67/1/EQ2101/1/30/HP/11874/MBH/2156/KW

587 67/2/EQ2101/1/25/HP/2620/MBH/2300/KW

588 67/3/EQ2000

589 69/1/EQ4003//EQ4003

590 69/2/////EQ4003

591 69/3/EQ4003//EQ4003

592 69/4

593 69/5/EQ4003//EQ4003

594 69/6/EQ4003//EQ4003

595 74/1/EQ5100/750/TONS/.031/KW-TON/T-WATER/CTOWER/2/50/50/PERCENT

596 LOAD - 4

597 19/4/LOW E GLASS

598 20/1/1/SUB BSMT, BSMT W/1/45125/4/1//10

599 20/2/2/TOILETS, KITCHEN/1/3520/4/2//11

600 20/3/3/STAIRS/1/560/4/0//11

601 20/4/4/BSMT E/1/12424/4/3.3//12.7

602 20/5/5/1ST FL OFFICES/1/11724/4/1.3//12

603 20/6/6/1ST FL CEN OFFCS/1/9884/4/1.3//12

604 20/7/7/2ND FL OFFICES/1/14400/4/1.3//10.7

605 20/8/8/2ND FL CEN OFFCS/1/8674/4/0//10.7

606 20/9/9/3RD FL OFFICES/1/14400/4/1.3//11

607 20/10/10/3RD FL CEN OFFCS/1/8563/4/0//11

608 20/11/11/TOILETS W ROOF/1/580/4/2//11

609 20/12/12/STAIRS W ROOF/1/280/4/0//11

610 20/13/13/SUPPLY STORAGE/1/2544/4/0//12.7

611 20/14/14/1ST FL CEN OFFCS/9884/1/4/1.3//12

612 20/15/15/2ND FL CEN OFFCS/8674/1/4/0//10.7

613 20/16/16/3RD FL CEN OFFCS/8563/1/4/0//11

614 21/M///CBADCTX///CBADHTX

615 22/9/1/YESES///14

616 22/10/1/YESES///14

617 22/11/1/YESES///14

618 22/12/1/YESES///14

619 22/16/1/YESES///14

620 24/2/1/9/10.3//134/45

621 24/2/2/10/10.3//134/315

622 24/3/1/16/11//135/45

623 24/3/2/48/11//135/135

624 24/3/3/16/11//135/225

625 24/5/1/108/11.3//134/45

626 24/5/2/281/11.3//134/135

627 24/5/3/93/11.3//134/225

628 24/5/4/235/11.3//134/315

629 24/6/1/9/11.3//134/45

630 24/6/2/27/11.3//134/135

631 24/6/3/22/11.3//134/225

632 24/6/4/56/11.3//134/315

633 24/7/1/135/10//134/45

634 24/7/2/320/10//134/135

635 24/7/3/135/10//134/225

636 24/7/4/344/10//134/315

637 24/8/1/8/10//134/135

638 24/8/2/8/10//134/315

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LINE #	
639	24/9/1/135/10.3//134/45
640	24/9/2/320/10.3//134/135
641	24/9/3/135/10.3//134/225
642	24/9/4/344/10.3//134/315
643	24/10/1/8/10.3//134/135
644	24/10/2/8/10.3//134/315
645	24/12/1/8/10.3//135/45
646	24/12/2/24/10.3//135/135
647	24/12/3/8/10.3//135/225
648	24/14/1/9/11.3//134/45
649	24/14/2/27/11.3//134/135
650	24/14/3/22/11.3//134/225
651	24/14/4/56/11.3//134/315
652	24/15/1/8/10//134/135
653	24/15/2/8/10//134/315
654	24/16/1/8/10.3//134/135
655	24/16/2/8/10.3//134/315
656	25/2/1/8.5/2.5/1/.81/.29
657	25/3/1/8.5/2.5/6/.81/.29
658	25/3/3/8.5/2.5/6/.81/.29
659	25/5/1/8.5/2.5/5/.81/.29
660	25/5/2/8.5/2.5/35/.81/.29
661	25/5/3/8.5/2.5/6/.81/.29
662	25/5/4/8.5/2.5/28/.81/.29
663	25/6/1/8.5/2.5/5/.81/.29
664	25/6/2/8.5/2.5/7/.81/.29
665	25/7/1/7/2.5/6/.81/.29
666	25/7/2/7/2.5/40/.81/.29
667	25/7/3/7/2.5/6/.81/.29
668	25/7/4/7/2.5/40/.81/.29
669	25/8/1/7/2.5/3/.81/.29
670	25/8/2/7/2.5/3/.81/.29
671	25/9/1/7/2.5/6/.81/.29
672	25/9/2/7/2.5/40/.81/.29
673	25/9/3/7/2.5/6/.81/.29
674	25/9/4/7/2.5/40/.81/.29
675	25/10/1/7/2.5/3/.81/.29
676	25/10/2/7/2.5/3/.81/.29
677	25/12/1/7/2.5/3/.81/.29
678	25/12/3/7/2.5/3/.81/.29
679	25/14/1/8.5/2.5/5/.81/.29
680	25/14/2/8.5/2.5/7/.81/.29
681	25/15/1/7/2.5/3/.81/.29
682	25/15/2/7/2.5/3/.81/.29
683	25/16/1/7/2.5/3/.81/.29
684	25/16/2/7/2.5/3/.81/.29
685	26/1/CBAP&L/CBAP&L/CBAP&L/OFF/CBAP&L/CBAP&L/OFF/OFF/OFF/OFF
686	26/2/CBAP&L/CBAP&L/OFF/AVAIL/CBAP&L/OFF/OFF/OFF/CBAP&L/OFF
687	26/3/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF
688	26/4/CBAP&L/CBAP&L/CBAP&L/OFF/CBAP&L/CBAP&L/OFF/OFF/OFF/OFF
689	26/5/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF
690	26/6/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF
691	26/7/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF
692	26/8/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF
693	26/9/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF
694	26/10/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF
695	26/11/CBAP&L/CBAP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/CBAP&L/OFF
696	26/12/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF

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LINE # -----

697 26/13/CBAP&L/CBAP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/OFF

698 26/14/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/CFF/OFF/OFF/OFF

699 26/15/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/CFF/OFF/OFF/OFF

700 26/16/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF

701 27/M/420/SF-PERS/255/255/2.57/WATT-SF/ASHRAE2

702 29/1/30/PCT-MCLG/30/PCT-MHTG/0/0

703 29/2/0/PCT-MCLG/0/PCT-MHTG/0/0

704 29/3/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

705 29/4/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

706 29/5/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

707 29/6/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG

708 29/7/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

709 29/8/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG

710 29/9/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

711 29/10/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG

712 29/11/0/PCT-MCLG/0/PCT-MHTG/0/CFM-SF/0/CFM-SF

713 29/12/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

714 29/13/0/PCT-MCLG/0/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

715 29/14/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

716 29/15/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

717 29/16/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

718 30/1/23725/CFM/23725/CFM

719 30/2/14660/CFM/14660/CFM/////14660/CFM

720 30/3/360/CFM/360/CFM

721 30/4/12450/CFM/12450/CFM

722 30/5/5505/CFM/5505/CFM

723 30/6/10028/CFM/10028/CFM

724 30/7/6535/CFM/6535/CFM

725 30/8/8914/CFM/8914/CFM

726 30/9/6855/CFM/6855/CFM

727 30/10/8914/CFM/8914/CFM

728 30/11/3070/CFM/3070/CFM/////3070/CFM

729 30/12/180/CFM/180/CFM

730 30/13/0/CFM/1835/CFM

731 30/14/10028/CFM/10028/CFM

732 30/15/8914/CFM/8914/CFM

733 30/16/8914/CFM/8914/CFM

734 31/1/1/535/10//135/SINE-FIT/80/50

735 31/1/2/656/12//135/SINE-FIT/80/50

736 31/4/1/279/12//135/SINE-FIT/80/50

737 31/13/1/136/12//135/SINE-FIT/80/50

738 SYSTEM - 4

739 39/4/LOW E GLASS

740 40/1/TRH/ROADK

741 41/1/1/1/4/4

742 42/1/3/3/.65

743 44/1

744 45/1/CBAP&L/CBAP&L/OFF/OFF/OFF/OFF/CBAP&L/CBAP&L/OFF

745 40/2/SZ

746 41/2/2/2/11/11

747 42/2////.75//.75

748 44/2

749 45/2/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

750 40/3/INDFP

751 41/3/3/3/5/5/7/7/9/9/12/12

752 42/3/8/8/1

753 44/3/DRY-BULB/65/100

754 45/3/CBAP&L/CBAP&L/OFF/OFF/CBAP&L/OFF/CBAP&L/OFF/CBAP&L/OFF

CONTENTS OF : C:\JOBS\CB122.TM

LINE #	
755	40/4/UH
756	41/4/13/13
757	42/4/.20
758	44/4
759	45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
760	40/5/DD
761	41/5/6/6/8/8/10/10
762	42/5/8/8/1
763	44/5/DRY-BULB/65/100
764	45/5/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF
765	40/6/DD
766	41/6/14/16
767	42/6/8/8/1
768	45/6/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF
769	EQUIPMENT - 4
770	59/4/CARLISLE///LOW E GLASS
771	60/1/1/BLKPLANT/1/1/3/3/5/6
772	60/2/2/BLKPLANT/2/2
773	62/1/EQ1001S/2/306/TONS
774	62/2/EQ1000
775	63/1/30/HP/30/HP////1
776	65/1/1/1/1/3/3/5/6
777	65/2/2/1/1/3/6
778	65/3/3/2/2
779	66/1/1
780	66/2/2/2
781	67/1/EQ2101/1/30/HP/11874/M3H/2156/KW
782	67/2/EQ2101/1/25/HP/2620/M2H/2300/KW
783	67/3/EQ2000
784	69/1/EQ4003//EQ4003
785	69/2/////EQ4003
786	69/3/EQ4003//EQ4003
787	69/4
788	69/5/EQ4003//EQ4003
789	69/6/EQ4003//EQ4003
790	74/1/EQ5100/750/TONS/.031/KW-TON/T-WATER/CTOWER/2/50/50/PERCENT

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LINE # -----

- 1 JOB - 1
- 2 01/ENERGY SAVINGS OPPORTUNITY STUDY
- 3 01/CARLISLE BARRACKS, PA
- 4 01/DEPARTMENT OF THE ARMY
- 5 01/BENATEC ASSOCIATES
- 6 01/BUILDING 122
- 7 08/CARLISLE
- 8 09/MAY/SEP////APR/OCT
- 9 10/CLTD-CLF
- 10 11///ZONE
- 11 LOAD - 1
- 12 19/1/REPLACE FLUORESCENT LAMPS
- 13 20/1/1/SUB BSMT, BSMT W/1/45125/4/1//10
- 14 20/2/2/TOILETS, KITCHEN/1/3520/4/2//11
- 15 20/3/3/STAIRS/1/560/4/0//11
- 16 20/4/4/BSMT E/1/12424/4/3.3//12.7
- 17 20/5/5/1ST FL OFFICES/1/11724/4/1.3//12
- 18 20/6/6/1ST FL CEN OFFCS/1/9884/4/1.3//12
- 19 20/7/7/2ND FL OFFICES/1/14400/4/1.3//10.7
- 20 20/8/8/2ND FL CEN OFFCS/1/8674/4/0//10.7
- 21 20/9/9/3RD FL OFFICES/1/14400/4/1.3//11
- 22 20/10/10/3RD FL CEN OFFCS/1/8563/4/0//11
- 23 20/11/11/TOILETS W ROOF/1/580/4/2//11
- 24 20/12/12/STAIRS W ROOF/1/280/4/0//11
- 25 20/13/13/SUPPLY STORAGE/1/2544/4/0//12.7
- 26 20/14/14/1ST FL CEN OFFCS/9884/1/4/1.3//12
- 27 20/15/15/2ND FL CEN OFFCS/8674/1/4/0//10.7
- 28 20/16/16/3RD FL CEN OFFCS/8563/1/4/0//11
- 29 21/M///CBADCTX///CBADHTX
- 30 22/9/1/YES////14
- 31 22/10/1/YES////14
- 32 22/11/1/YES////14
- 33 22/12/1/YES////14
- 34 22/16/1/YES////14
- 35 24/2/1/9/10.3//134/45
- 36 24/2/2/10/10.3//134/315
- 37 24/3/1/16/11//135/45
- 38 24/3/2/48/11//135/135
- 39 24/3/3/16/11//135/225
- 40 24/5/1/108/11.3//134/45
- 41 24/5/2/281/11.3//134/135
- 42 24/5/3/93/11.3//134/225
- 43 24/5/4/235/11.3//134/315
- 44 24/6/1/9/11.3//134/45
- 45 24/6/2/27/11.3//134/135
- 46 24/6/3/22/11.3//134/225
- 47 24/6/4/56/11.3//134/315
- 48 24/7/1/135/10//134/45
- 49 24/7/2/320/10//134/135
- 50 24/7/3/135/10//134/225
- 51 24/7/4/344/10//134/315
- 52 24/8/1/8/10//134/135
- 53 24/8/2/8/10//134/315
- 54 24/9/1/135/10.3//134/45
- 55 24/9/2/320/10.3//134/135
- 56 24/9/3/135/10.3//134/225
- 57 24/9/4/344/10.3//134/315
- 58 24/10/1/8/10.3//134/135

CONTENTS OF : C:\JOBS\C81228.TM

LINE #	
59	24/10/2/8/10.3//134/315
60	24/12/1/8/10.3//135/45
61	24/12/2/24/10.3//135/135
62	24/12/3/8/10.3//135/225
63	24/14/1/9/11.3//134/45
64	24/14/2/27/11.3//134/135
65	24/14/3/22/11.3//134/225
66	24/14/4/56/11.3//134/315
67	24/15/1/8/10//134/135
68	24/15/2/8/10//134/315
69	24/16/1/8/10.3//134/135
70	24/16/2/8/10.3//134/315
71	25/2/1/8.5/2.5/1/.81/.64
72	25/3/1/8.5/2.5/6/.81/.64
73	25/3/3/8.5/2.5/6/.81/.64
74	25/5/1/8.5/2.5/5/.81/.64
75	25/5/2/8.5/2.5/35/.81/.64
76	25/5/3/8.5/2.5/6/.81/.64
77	25/5/4/8.5/2.5/28/.81/.64
78	25/6/1/8.5/2.5/5/.81/.64
79	25/6/2/8.5/2.5/7/.81/.64
80	25/7/1/7/2.5/6/.81/.64
81	25/7/2/7/2.5/40/.81/.64
82	25/7/3/7/2.5/6/.81/.64
83	25/7/4/7/2.5/40/.81/.64
84	25/8/1/7/2.5/3/.81/.64
85	25/8/2/7/2.5/3/.81/.64
86	25/9/1/7/2.5/6/.81/.64
87	25/9/2/7/2.5/40/.81/.64
88	25/9/3/7/2.5/6/.81/.64
89	25/9/4/7/2.5/40/.81/.64
90	25/10/1/7/2.5/3/.81/.64
91	25/10/2/7/2.5/3/.81/.64
92	25/12/1/7/2.5/3/.81/.64
93	25/12/3/7/2.5/3/.81/.64
94	25/14/1/8.5/2.5/5/.81/.64
95	25/14/2/8.5/2.5/7/.81/.64
96	25/15/1/7/2.5/3/.81/.64
97	25/15/2/7/2.5/3/.81/.64
98	25/16/1/7/2.5/3/.81/.64
99	25/16/2/7/2.5/3/.81/.64
100	26/1/CBAP&L/CBAP&L/CBAPFAN/OFF/CBAPFAN/CBAPFAN/OFF/OFF/OFF/OFF
101	26/2/CBAP&L/CBAP&L/OFF/AVAIL/CBAPFAN/OFF/OFF/OFF/CBAPFAN/OFF
102	26/3/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
103	26/4/CBAP&L/CBAP&L/CBAPFAN/OFF/CBAPFAN/CBAPFAN/OFF/OFF/OFF/OFF
104	26/5/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
105	26/6/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
106	26/7/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
107	26/8/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
108	26/9/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
109	26/10/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
110	26/11/CBAP&L/CBAP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/CBAPFAN/OFF
111	26/12/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
112	26/13/CBAP&L/CBAP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/OFF/OFF
113	26/14/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
114	26/15/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
115	26/16/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
116	27/M/420/SF-PERS/255/255/2.31/WATT-SF/ASHRAE2

CONTENTS OF : C:\JOBS\CB1228.TM

LINE # -----

117 29/1/30/PCT-MCLG/30/PCT-MHTG/0//0

118 29/2/0/PCT-MCLG/0/PCT-MHTG/0//0

119 29/3/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

120 29/4/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

121 29/5/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

122 29/6/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG

123 29/7/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

124 29/8/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG

125 29/9/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

126 29/10/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG

127 29/11/0/PCT-MCLG/0/PCT-MHTG/0/CFM-SF/0/CFM-SF

128 29/12/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

129 29/13/0/PCT-MCLG/0/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

130 29/14/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

131 29/15/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

132 29/16/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

133 30/1/23725/CFM/23725/CFM

134 30/2/14660/CFM/14660/CFM/////14660/CFM

135 30/3/360/CFM/360/CFM

136 30/4/12450/CFM/12450/CFM

137 30/5/5505/CFM/5505/CFM

138 30/6/10028/CFM/10028/CFM

139 30/7/6535/CFM/6535/CFM

140 30/8/8914/CFM/8914/CFM

141 30/9/6855/CFM/6855/CFM

142 30/10/8914/CFM/8914/CFM

143 30/11/3070/CFM/3070/CFM/////3070/CFM

144 30/12/180/CFM/180/CFM

145 30/13/0/CFM/1835/CFM

146 30/14/10028/CFM/10028/CFM

147 30/15/8914/CFM/8914/CFM

148 30/16/8914/CFM/8914/CFM

149 31/1/1/535/10//135/SINE-FIT/80/50

150 31/1/2/656/12//135/SINE-FIT/80/50

151 31/4/1/279/12//135/SINE-FIT/80/50

152 31/13/1/136/12//135/SINE-FIT/80/50

153 SYSTEM - 1

154 39/1/REPLACE FLUORESCENT LAMPS

155 40/1/TRH/ROADK

156 41/1/1/1/4/4

157 42/1/3/3/.65

158 44/1

159 45/1/CBADCLG/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/CBADHTG/CBADFAN/OFF

160 40/2/SZ

161 41/2/2/2/11/11

162 42/2////.75//.75

163 44/2

164 45/2/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

165 40/3/INDFP

166 41/3/3/3/5/5/7/7/9/9/12/12

167 42/3/8/8/1

168 44/3/DRY-BULB/65/100

169 45/3/CBADCLG/CBADCLG/OFF/OFF/CBADCLG/OFF/CBADHTG/OFF/CBADFAN/CBADHTG

170 40/4/UH

171 41/4/13/13

172 42/4/.20

173 44/4

174 45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF

CONTENTS OF : C:\JOBS\CB122B.TM

LINE # -----

175 40/5/DD

176 41/5/6/6/8/8/10/10

177 42/5/8/8/1

178 44/5/DRY-BULB/65/100

179 45/5/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF

180 40/6/DD

181 41/6/14/16

182 42/6/8/8/1

183 45/6/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF

184 EQUIPMENT - 1

185 59/1/CARLISLE///REPLACE FLUORESCENT LAMPS

186 60/1/1/BLKPLANT/1/1/3/3/5/6

187 60/2/2/BLKPLANT/2/2

188 62/1/EQ1001S/2/306/TONS

189 62/2/EQ1000

190 63/1/30/HP/30/HP/////1

191 65/1/1/1/1/3/3/5/6

192 65/2/2/1/1/3/6

193 65/3/3/2/2

194 66/1/1

195 66/2/2/2

196 67/1/EQ2101/1/30/HP/11874/MBH/2156/KW

197 67/2/EQ2101/1/25/HP/2620/MBH/2300/KW

198 67/3/EQ2000

199 69/1/EQ4003//EQ4003

200 69/2/////EQ4003

201 69/3/EQ4003//EQ4003

202 69/4

203 69/5/EQ4003//EQ4003

204 69/6/EQ4003//EQ4003

205 74/1/EQ5100/750/TONS/.031/KW-TON/T-WATER/CTOWER/2/50/50/PERCENT

206 LOAD - 2

207 19/2/REPLACE FLUORESCENT BALLASTS

208 20/1/1/SUB BSMT, BSMT W/1/45125/4/1//10

209 20/2/2/TOILETS, KITCHEN/1/3520/4/2//11

210 20/3/3/STAIRS/1/560/4/0//11

211 20/4/4/BSMT E/1/12424/4/3.3//12.7

212 20/5/5/1ST FL OFFICES/1/11724/4/1.3//12

213 20/6/6/1ST FL CEN OFFCS/1/9884/4/1.3//12

214 20/7/7/2ND FL OFFICES/1/14400/4/1.3//10.7

215 20/8/8/2ND FL CEN OFFCS/1/8674/4/0//10.7

216 20/9/9/3RD FL OFFICES/1/14400/4/1.3//11

217 20/10/10/3RD FL CEN OFFCS/1/8563/4/0//11

218 20/11/11/TOILETS W ROOF/1/580/4/2//11

219 20/12/12/STAIRS W ROOF/1/280/4/0//11

220 20/13/13/SUPPLY STORAGE/1/2544/4/0//12.7

221 20/14/14/1ST FL CEN OFFCS/9884/1/4/1.3//12

222 20/15/15/2ND FL CEN OFFCS/8674/1/4/0//10.7

223 20/16/16/3RD FL CEN OFFCS/8563/1/4/0//11

224 21/M///CBADCTX///CBADHTX

225 22/9/1/YES////14

226 22/10/1/YES////14

227 22/11/1/YES////14

228 22/12/1/YES////14

229 22/16/1/YES////14

230 24/2/1/9/10.3//134/45

231 24/2/2/10/10.3//134/315

232 24/3/1/16/11//135/45

LINE #	
233	24/3/2/48/11//135/135
234	24/3/3/16/11//135/225
235	24/5/1/108/11.3//134/45
236	24/5/2/281/11.3//134/135
237	24/5/3/93/11.3//134/225
238	24/5/4/235/11.3//134/315
239	24/6/1/9/11.3//134/45
240	24/6/2/27/11.3//134/135
241	24/6/3/22/11.3//134/225
242	24/6/4/56/11.3//134/315
243	24/7/1/135/10//134/45
244	24/7/2/320/10//134/135
245	24/7/3/135/10//134/225
246	24/7/4/344/10//134/315
247	24/8/1/8/10//134/135
248	24/8/2/8/10//134/315
249	24/9/1/135/10.3//134/45
250	24/9/2/320/10.3//134/135
251	24/9/3/135/10.3//134/225
252	24/9/4/344/10.3//134/315
253	24/10/1/8/10.3//134/135
254	24/10/2/8/10.3//134/315
255	24/12/1/8/10.3//135/45
256	24/12/2/24/10.3//135/135
257	24/12/3/8/10.3//135/225
258	24/14/1/9/11.3//134/45
259	24/14/2/27/11.3//134/135
260	24/14/3/22/11.3//134/225
261	24/14/4/56/11.3//134/315
262	24/15/1/8/10//134/135
263	24/15/2/8/10//134/315
264	24/16/1/8/10.3//134/135
265	24/16/2/8/10.3//134/315
266	25/2/1/8.5/2.5/1/.81/.64
267	25/3/1/8.5/2.5/6/.81/.64
268	25/3/3/8.5/2.5/6/.81/.64
269	25/5/1/8.5/2.5/5/.81/.64
270	25/5/2/8.5/2.5/35/.81/.64
271	25/5/3/8.5/2.5/6/.81/.64
272	25/5/4/8.5/2.5/28/.81/.64
273	25/6/1/8.5/2.5/5/.81/.64
274	25/6/2/8.5/2.5/7/.81/.64
275	25/7/1/7/2.5/6/.81/.64
276	25/7/2/7/2.5/40/.81/.64
277	25/7/3/7/2.5/6/.81/.64
278	25/7/4/7/2.5/40/.81/.64
279	25/8/1/7/2.5/3/.81/.64
280	25/8/2/7/2.5/3/.81/.64
281	25/9/1/7/2.5/6/.81/.64
282	25/9/2/7/2.5/40/.81/.64
283	25/9/3/7/2.5/6/.81/.64
284	25/9/4/7/2.5/40/.81/.64
285	25/10/1/7/2.5/3/.81/.64
286	25/10/2/7/2.5/3/.81/.64
287	25/12/1/7/2.5/3/.81/.64
288	25/12/3/7/2.5/3/.81/.64
289	25/14/1/8.5/2.5/5/.81/.64
290	25/14/2/8.5/2.5/7/.81/.64

LINE # -----

291 25/15/1/7/2.5/3/.81/.64

292 25/15/2/7/2.5/3/.81/.64

293 25/16/1/7/2.5/3/.81/.64

294 25/16/2/7/2.5/3/.81/.64

295 26/1/CBAP&L/CBAP&L/CBAP&L/OFF/CBAP&L/CBAP&L/OFF/OFF/OFF/OFF

296 26/2/CBAP&L/CBAP&L/OFF/AVAIL/CBAP&L/OFF/OFF/OFF/CBAP&L/OFF

297 26/3/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF

298 26/4/CBAP&L/CBAP&L/CBAP&L/OFF/CBAP&L/CBAP&L/OFF/OFF/OFF/OFF

299 26/5/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF

300 26/6/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF

301 26/7/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF

302 26/8/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF

303 26/9/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF

304 26/10/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF

305 26/11/CBAP&L/CBAP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/CBAP&L/OFF

306 26/12/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF

307 26/13/CBAP&L/CBAP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/OFF

308 26/14/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF

309 26/15/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF

310 26/16/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF

311 27/M/420/SF-PERS/255/255/2.0C/WATT-SF/ASHRAE2

312 29/1/30/PCT-MCLG/30/PCT-MHTG/0/0

313 29/2/0/PCT-MCLG/0/PCT-MHTG/0/0

314 29/3/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

315 29/4/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

316 29/5/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

317 29/6/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG

318 29/7/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

319 29/8/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG

320 29/9/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

321 29/10/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG

322 29/11/0/PCT-MCLG/0/PCT-MHTG/0/CFM-SF/0/CFM-SF

323 29/12/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

324 29/13/0/PCT-MCLG/0/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

325 29/14/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

326 29/15/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

327 29/16/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

328 30/1/23725/CFM/23725/CFM

329 30/2/14660/CFM/14660/CFM/////14660/CFM

330 30/3/360/CFM/360/CFM

331 30/4/12450/CFM/12450/CFM

332 30/5/5505/CFM/5505/CFM

333 30/6/10028/CFM/10028/CFM

334 30/7/6535/CFM/6535/CFM

335 30/8/8914/CFM/8914/CFM

336 30/9/6855/CFM/6855/CFM

337 30/10/8914/CFM/8914/CFM

338 30/11/3070/CFM/3070/CFM/////3070/CFM

339 30/12/180/CFM/180/CFM

340 30/13/0/CFM/1835/CFM

341 30/14/10028/CFM/10028/CFM

342 30/15/8914/CFM/8914/CFM

343 30/16/8914/CFM/8914/CFM

344 31/1/1/535/10//135/SINE-FIT/80/50

345 31/1/2/656/12//135/SINE-FIT/80/50

346 31/4/1/279/12//135/SINE-FIT/80/50

347 31/13/1/136/12//135/SINE-FIT/80/50

348 SYSTEM - 2

CONTENTS OF : C:\JOBS\CB122B.TM

LINE # -----

349 39/2/REPLACE FLUORESCENT BALLASTS

350 40/1/TRH/ROADK

351 41/1/1/1/4/4

352 42/1/3/3/.65

353 44/1

354 45/1/CBADCLG/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/CBADHTG/CBADFAN/OFF

355 40/2/SZ

356 41/2/2/2/11/11

357 42/2/1/1/.75/1.75

358 44/2

359 45/2/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

360 40/3/INDFP

361 41/3/3/3/5/5/7/7/9/9/12/12

362 42/3/8/8/1

363 44/3/DRY-BULB/65/100

364 45/3/CBADCLG/CBADCLG/OFF/OFF/CBADCLG/OFF/CBADHTG/OFF/CBADFAN/CBADHTG

365 40/4/UH

366 41/4/13/13

367 42/4/.20

368 44/4

369 45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF

370 40/5/00

371 41/5/6/6/8/8/10/10

372 42/5/8/8/1

373 44/5/DRY-BULB/65/100

374 45/5/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF

375 40/6/00

376 41/6/14/16

377 42/6/8/8/1

378 45/6/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF

379 EQUIPMENT - 2

380 59/2/CARLISLE///REPLACE FLUORESCENT BALLASTS

381 60/1/1/BLKPLANT/1/1/3/3/5/6

382 60/2/2/BLKPLANT/2/2

383 62/1/EQ1001S/2/306/TONS

384 62/2/EQ1000

385 63/1/30/HP/30/HP/////1

386 65/1/1/1/1/3/3/5/6

387 65/2/2/1/1/3/6

388 65/3/3/2/2

389 66/1/1

390 66/2/2/2

391 67/1/EQ2101/1/30/HP/11874/MBH/2156/KW

392 67/2/EQ2101/1/25/HP/2620/MBH/2300/KW

393 67/3/EQ2000

394 69/1/EQ4003//EQ4003

395 69/2/////EQ4003

396 69/3/EQ4003//EQ4003

397 69/4

398 69/5/EQ4003//EQ4003

399 69/6/EQ4003//EQ4003

400 74/1/EQ5100/750/TONS/.031/KW-TON/T-WATER/CTOWER/2/50/50/PERCENT

401 LOAD - 3

402 19/3/REPLACE FLUORESCENT FIXTURES

403 20/1/1/SUB BSMT, BSMT W/1/45125/4/1//10

404 20/2/2/TOILETS, KITCHEN/1/3520/4/2//11

405 20/3/3/STAIRS/1/560/4/0//11

406 20/4/4/BSMT E/1/12424/4/3.3//12.7

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LINE #

407 20/5/5/1ST FL OFFICES/1/11724/4/1.3//12

408 20/6/6/1ST FL CEN OFFCS/1/9884/4/1.3//12

409 20/7/7/2ND FL OFFICES/1/14400/4/1.3//10.7

410 20/8/8/2ND FL CEN OFFCS/1/8674/4/0//10.7

411 20/9/9/3RD FL OFFICES/1/14400/4/1.3//11

412 20/10/10/3RD FL CEN OFFCS/1/2563/4/0//11

413 20/11/11/TOILETS W ROOF/1/590/4/2//11

414 20/12/12/STAIRS W ROOF/1/280/4/0//11

415 20/13/13/SUPPLY STORAGE/1/2544/4/0//12.7

416 20/14/14/1ST FL CEN OFFCS/9884/1/4/1.3//12

417 20/15/15/2ND FL CEN OFFCS/8674/1/4/0//10.7

418 20/16/16/3RD FL CEN OFFCS/2563/1/4/0//11

419 21/M///CBADCTX///CCADHTX

420 22/9/1/YES////14

421 22/10/1/YES////14

422 22/11/1/YES////14

423 22/12/1/YES////14

424 22/16/1/YES////14

425 24/2/1/9/10.3//134/45

426 24/2/2/10/10.3//134/315

427 24/3/1/16/11//135/45

428 24/3/2/48/11//135/135

429 24/3/3/16/11//135/225

430 24/5/1/108/11.3//134/45

431 24/5/2/281/11.3//134/135

432 24/5/3/93/11.3//134/225

433 24/5/4/235/11.3//134/315

434 24/6/1/9/11.3//134/45

435 24/6/2/27/11.3//134/135

436 24/6/3/22/11.3//134/225

437 24/6/4/56/11.3//134/315

438 24/7/1/135/10//134/45

439 24/7/2/320/10//134/135

440 24/7/3/135/10//134/225

441 24/7/4/344/10//134/315

442 24/8/1/8/10//134/135

443 24/8/2/8/10//134/315

444 24/9/1/135/10.3//134/45

445 24/9/2/320/10.3//134/135

446 24/9/3/135/10.3//134/225

447 24/9/4/344/10.3//134/315

448 24/10/1/8/10.3//134/135

449 24/10/2/8/10.3//134/315

450 24/12/1/8/10.3//135/45

451 24/12/2/24/10.3//135/135

452 24/12/3/8/10.3//135/225

453 24/14/1/9/11.3//134/45

454 24/14/2/27/11.3//134/135

455 24/14/3/22/11.3//134/225

456 24/14/4/56/11.3//134/315

457 24/15/1/8/10//134/135

458 24/15/2/8/10//134/315

459 24/16/1/8/10.3//134/135

460 24/16/2/8/10.3//134/315

461 25/2/1/8.5/2.5/1/.81/.64

462 25/3/1/8.5/2.5/6/.81/.64

463 25/3/3/8.5/2.5/6/.81/.64

464 25/5/1/8.5/2.5/5/.81/.64

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LINE # -----

465 25/5/2/8.5/2.5/35/.81/.64

466 25/5/3/8.5/2.5/6/.81/.64

467 25/5/4/8.5/2.5/28/.81/.64

468 25/6/1/8.5/2.5/5/.81/.64

469 25/6/2/8.5/2.5/7/.81/.64

470 25/7/1/7/2.5/6/.81/.64

471 25/7/2/7/2.5/40/.81/.64

472 25/7/3/7/2.5/6/.81/.64

473 25/7/4/7/2.5/40/.81/.64

474 25/8/1/7/2.5/3/.81/.64

475 25/8/2/7/2.5/3/.81/.64

476 25/9/1/7/2.5/6/.81/.64

477 25/9/2/7/2.5/40/.81/.64

478 25/9/3/7/2.5/6/.81/.64

479 25/9/4/7/2.5/40/.81/.64

480 25/10/1/7/2.5/3/.81/.64

481 25/10/2/7/2.5/3/.81/.64

482 25/12/1/7/2.5/3/.81/.64

483 25/12/3/7/2.5/3/.81/.64

484 25/14/1/8.5/2.5/5/.81/.64

485 25/14/2/8.5/2.5/7/.81/.64

486 25/15/1/7/2.5/3/.81/.64

487 25/15/2/7/2.5/3/.81/.64

488 25/16/1/7/2.5/3/.81/.64

489 25/16/2/7/2.5/3/.81/.64

490 26/1/CBAP&L/CBAP&L/CBAP&L/OFF/CBAP&L/CBAP&L/OFF/OFF/OFF/OFF

491 26/2/CBAP&L/CBAP&L/OFF/AVAIL/CBAP&L/OFF/OFF/OFF/CBAP&L/OFF

492 26/3/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF

493 26/4/CBAP&L/CBAP&L/CBAP&L/OFF/CBAP&L/CBAP&L/OFF/OFF/OFF/OFF

494 26/5/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF

495 26/6/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF

496 26/7/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF

497 26/8/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF

498 26/9/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF

499 26/10/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF

500 26/11/CBAP&L/CBAP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/CBAP&L/OFF

501 26/12/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF

502 26/13/CBAP&L/CBAP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/OFF

503 26/14/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF

504 26/15/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF

505 26/16/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF

506 27/M/420/SF-PERS/255/255/1.66/WATT-SF/ASHRAE2

507 29/1/30/PCT-MCLG/30/PCT-MHTG/0/0/0

508 29/2/0/PCT-MCLG/0/PCT-MHTG/0/0/0

509 29/3/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

510 29/4/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

511 29/5/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

512 29/6/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG

513 29/7/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

514 29/8/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG

515 29/9/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

516 29/10/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG

517 29/11/0/PCT-MCLG/0/PCT-MHTG/0/CFM-SF/0/CFM-SF

518 29/12/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

519 29/13/0/PCT-MCLG/0/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

520 29/14/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

521 29/15/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

522 29/16/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

CONTENTS OF : C:\JOBS\CB122B.TM

LINE #	
523	30/1/23725/CFM/23725/CFM
524	30/2/14660/CFM/14660/CFM////14660/CFM
525	30/3/360/CFM/360/CFM
526	30/4/12450/CFM/12450/CFM
527	30/5/5505/CFM/5505/CFM
528	30/6/10028/CFM/10028/CFM
529	30/7/6535/CFM/6535/CFM
530	30/8/8914/CFM/8914/CFM
531	30/9/6855/CFM/6855/CFM
532	30/10/8914/CFM/8914/CFM
533	30/11/3070/CFM/3070/CFM////3070/CFM
534	30/12/180/CFM/180/CFM
535	30/13/0/CFM/1835/CFM
536	30/14/10028/CFM/10028/CFM
537	30/15/8914/CFM/8914/CFM
538	30/16/8914/CFM/8914/CFM
539	31/1/1/535/10//135/SINE-FIT/80/50
540	31/1/2/656/12//135/SINE-FIT/80/50
541	31/4/1/279/12//135/SINE-FIT/80/50
542	31/13/1/136/12//135/SINE-FIT/80/50
543	SYSTEM - 3
544	39/3/REPLACE FLUORESCENT FIXTURES
545	40/1/TRH/ROADK
546	41/1/1/1/4/4
547	42/1/3/3/.65
548	44/1
549	45/1/CBADCLG/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/CBADHTG/CBADFAN/OFF
550	40/2/SZ
551	41/2/2/2/11/11
552	42/2////.75//.75
553	44/2
554	45/2/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
555	40/3/INDFP
556	41/3/3/3/5/5/7/7/9/9/12/12
557	42/3/8/8/1
558	44/3/DRY-BULB/65/100
559	45/3/CBADCLG/CBADCLG/OFF/OFF/CBADCLG/OFF/CBADHTG/OFF/CBADFAN/CBADHTG
560	40/4/UH
561	41/4/13/13
562	42/4/.20
563	44/4
564	45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
565	40/5/DD
566	41/5/6/6/8/8/10/10
567	42/5/8/8/1
568	44/5/DRY-BULB/65/100
569	45/5/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF
570	40/6/DD
571	41/6/14/16
572	42/6/8/8/1
573	45/6/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF
574	EQUIPMENT - 3
575	59/3/CARLISLE//REPLACE FLUORESCENT FIXTURES
576	60/1/1/BLKPLANT/1/1/3/3/5/6
577	60/2/2/BLKPLANT/2/2
578	62/1/EQ1001S/2/306/TONS
579	62/2/EQ1000
580	63/1/30/HP/30/HP////1

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LINE # -----

581 65/1/1/1/1/3/3/5/6

582 65/2/2/1/1/3/6

583 65/3/3/2/2

584 66/1/1

585 66/2/2/2

586 67/1/EQ2101/1/30/HP/11874/MBH/2156/KW

587 67/2/EQ2101/1/25/HP/2620/MBH/2300/KW

588 67/3/EQ2000

589 69/1/EQ4003//EQ4003

590 69/2/////EQ4003

591 69/3/EQ4003//EQ4003

592 69/4

593 69/5/EQ4003//EQ4003

594 69/6/EQ4003//EQ4003

595 74/1/EQ5100/750/TONS/.031/KW-TON/T-WATER/CTOWER/2/50/50/PERCENT

596 LOAD - 4

597 19/4/HEAT RECOVERY

598 20/1/1/SUB BSMT, BSMT W/1/45125/4/1//10

599 20/2/2/TOILETS, KITCHEN/1/3520/4/2//11

600 20/3/3/STAIRS/1/560/4/0//11

601 20/4/4/BSMT E/1/12424/4/3.3//12.7

602 20/5/5/1ST FL OFFICES/1/11724/4/1.3//12

603 20/6/6/1ST FL CEN OFFCS/1/9884/4/1.3//12

604 20/7/7/2ND FL OFFICES/1/14400/4/1.3//10.7

605 20/8/8/2ND FL CEN OFFCS/1/8674/4/0//10.7

606 20/9/9/3RD FL OFFICES/1/14400/4/1.3//11

607 20/10/10/3RD FL CEN OFFCS/1/8563/4/0//11

608 20/11/11/TOILETS W ROOF/1/580/4/2//11

609 20/12/12/STAIRS W ROOF/1/280/4/0//11

610 20/13/13/SUPPLY STORAGE/1/2544/4/0//12.7

611 20/14/14/1ST FL CEN OFFCS/9884/1/4/1.3//12

612 20/15/15/2ND FL CEN OFFCS/8674/1/4/0//10.7

613 20/16/16/3RD FL CEN OFFCS/8563/1/4/0//11

614 21/M///CBADCTX///CBADHTX

615 22/9/1/YES///14

616 22/10/1/YES///14

617 22/11/1/YES///14

618 22/12/1/YES///14

619 22/16/1/YES///14

620 24/2/1/9/10.3//134/45

621 24/2/2/10/10.3//134/315

622 24/3/1/16/11//135/45

623 24/3/2/48/11//135/135

624 24/3/3/16/11//135/225

625 24/5/1/108/11.3//134/45

626 24/5/2/281/11.3//134/135

627 24/5/3/93/11.3//134/225

628 24/5/4/235/11.3//134/315

629 24/6/1/9/11.3//134/45

630 24/6/2/27/11.3//134/135

631 24/6/3/22/11.3//134/225

632 24/6/4/56/11.3//134/315

633 24/7/1/135/10//134/45

634 24/7/2/320/10//134/135

635 24/7/3/135/10//134/225

636 24/7/4/344/10//134/315

637 24/8/1/8/10//134/135

638 24/8/2/8/10//134/315

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LINE #	
639	24/9/1/135/10.3//134/45
640	24/9/2/320/10.3//134/135
641	24/9/3/135/10.3//134/225
642	24/9/4/344/10.3//134/315
643	24/10/1/8/10.3//134/135
644	24/10/2/8/10.3//134/315
645	24/12/1/8/10.3//135/45
646	24/12/2/24/10.3//135/135
647	24/12/3/8/10.3//135/225
648	24/14/1/9/11.3//134/45
649	24/14/2/27/11.3//134/135
650	24/14/3/22/11.3//134/225
651	24/14/4/56/11.3//134/315
652	24/15/1/8/10//134/135
653	24/15/2/8/10//134/315
654	24/16/1/8/10.3//134/135
655	24/16/2/8/10.3//134/315
656	25/2/1/8.5/2.5/1/.81/.64
657	25/3/1/8.5/2.5/6/.81/.64
658	25/3/3/8.5/2.5/6/.81/.64
659	25/5/1/8.5/2.5/5/.81/.64
660	25/5/2/8.5/2.5/35/.81/.64
661	25/5/3/8.5/2.5/6/.81/.64
662	25/5/4/8.5/2.5/28/.81/.64
663	25/6/1/8.5/2.5/5/.81/.64
664	25/6/2/8.5/2.5/7/.81/.64
665	25/7/1/7/2.5/6/.81/.64
666	25/7/2/7/2.5/40/.81/.64
667	25/7/3/7/2.5/6/.81/.64
668	25/7/4/7/2.5/40/.81/.64
669	25/8/1/7/2.5/3/.81/.64
670	25/8/2/7/2.5/3/.81/.64
671	25/9/1/7/2.5/6/.81/.64
672	25/9/2/7/2.5/40/.81/.64
673	25/9/3/7/2.5/6/.81/.64
674	25/9/4/7/2.5/40/.81/.64
675	25/10/1/7/2.5/3/.81/.64
676	25/10/2/7/2.5/3/.81/.64
677	25/12/1/7/2.5/3/.81/.64
678	25/12/3/7/2.5/3/.81/.64
679	25/14/1/8.5/2.5/5/.81/.64
680	25/14/2/8.5/2.5/7/.81/.64
681	25/15/1/7/2.5/3/.81/.64
682	25/15/2/7/2.5/3/.81/.64
683	25/16/1/7/2.5/3/.81/.64
684	25/16/2/7/2.5/3/.81/.64
685	26/1/CBAP&L/CBAP&L/CBAPFAN/OFF/CBAPFAN/CBAPFAN/OFF/OFF/OFF/OFF
686	26/2/CBAP&L/CBAP&L/OFF/AVAIL/CBAPFAN/OFF/OFF/OFF/CBAPFAN/OFF
687	26/3/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
688	26/4/CBAP&L/CBAP&L/CBAPFAN/OFF/CBAPFAN/CBAPFAN/OFF/OFF/OFF/OFF
689	26/5/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
690	26/6/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
691	26/7/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
692	26/8/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
693	26/9/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
694	26/10/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF
695	26/11/CBAP&L/CBAP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/CBAPFAN/OFF
696	26/12/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF

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LINE # -----

697 26/13/CBAP&L/CBAP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/OFF

698 26/14/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF

699 26/15/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF

700 26/16/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF

701 27/M/420/SF-PERS/255/255/2.57/WATT-SF/ASHRAE2

702 29/1/30/PCT-MCLG/30/PCT-MHTG/0//0

703 29/2/0/PCT-MCLG/0/PCT-MHTG/0//0

704 29/3/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

705 29/4/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

706 29/5/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

707 29/6/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG

708 29/7/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

709 29/8/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG

710 29/9/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

711 29/10/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG

712 29/11/0/PCT-MCLG/0/PCT-MHTG/0/CFM-SF/0/CFM-SF

713 29/12/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

714 29/13/0/PCT-MCLG/0/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

715 29/14/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

716 29/15/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

717 29/16/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

718 30/1/23725/CFM/23725/CFM

719 30/2/14660/CFM/14660/CFM/////14660/CFM

720 30/3/360/CFM/360/CFM

721 30/4/12450/CFM/12450/CFM

722 30/5/5505/CFM/5505/CFM

723 30/6/10028/CFM/10028/CFM

724 30/7/6535/CFM/6535/CFM

725 30/8/8914/CFM/8914/CFM

726 30/9/6855/CFM/6855/CFM

727 30/10/8914/CFM/8914/CFM

728 30/11/3070/CFM/3070/CFM/////3070/CFM

729 30/12/180/CFM/180/CFM

730 30/13/0/CFM/1835/CFM

731 30/14/10028/CFM/10028/CFM

732 30/15/8914/CFM/8914/CFM

733 30/16/8914/CFM/8914/CFM

734 31/1/1/535/10//135/SINE-FIT/80/50

735 31/1/2/656/12//135/SINE-FIT/80/50

736 31/4/1/279/12//135/SINE-FIT/80/50

737 31/13/1/136/12//135/SINE-FIT/80/50

738 SYSTEM - 4

739 39/4/HEAT RECOVERY

740 40/1/TRH/ROADK

741 41/1/1/1/4/4

742 42/1/3/3/.65

743 44/1/////////60//CLG-HTG//RM-EXH

744 45/1/CBAPCLG/CBAPCLG/OFF/OFF/OFF/OFF/CBAPHTG/CBAPHTG/CBAPFAN/OFF

745 40/2/SZ

746 41/2/2/2/11/11

747 42/2////.75//.75

748 44/2

749 45/2/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

750 40/3/INDFP

751 41/3/3/3/5/5/7/7/9/9/12/12

752 42/3/8/8/1

753 44/3/////////60//CLG-HTG//RM-EXH

754 45/3/CBAPCLG/CBAPCLG/OFF/OFF/CBAPCLG/OFF/CBAPHTG/OFF/CBAPFAN/CBAPHTG

CONTENTS OF : C:\JOBS\CB122B.TM

LINE #	
755	40/4/UH
756	41/4/13/13
757	42/4/.20
758	44/4
759	45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF
760	40/5/DD
761	41/5/6/6/8/8/10/10
762	42/5/8/8/1
763	44/5/////////60//CLG-HTG//RM-EXH
764	45/5/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF
765	40/6/DD
766	41/6/14/16
767	42/6/8/8/1
768	45/6/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF
769	EQUIPMENT - 4
770	59/4/CARLISLE///HEAT RECOVERY
771	60/1/1/BLKPLANT/1/1/3/3/5/6
772	60/2/2/BLKPLANT/2/2
773	62/1/EQ1001S/2/306/TONS
774	62/2/EQ1000
775	63/1/30/HP/30/HP////////1
776	65/1/1/1/1/1/3/3/5/6
777	65/2/2/1/1/1/3/6
778	65/3/3/2/2
779	66/1/1
780	66/2/2/2
781	67/1/EQ2101/1/30/HP/11874/MBH/2156/KW
782	67/2/EQ2101/1/25/HP/2620/MBH/2300/KW
783	67/3/EQ2000
784	69/1/EQ4003//EQ4003
785	69/2////////EQ4003
786	69/3/EQ4003//EQ4003
787	69/4
788	69/5/EQ4003//EQ4003
789	69/6/EQ4003//EQ4003
790	74/1/EQ5100/750/TONS/.031/KW-TON/T-WATER/CTOWER/2/50/50/PERCENT

CONTENTS OF : E:\CB122C.TM

LINE # -----

1 JOB - 1

2 01/ENERGY SAVINGS OPPORTUNITY STUDY

3 01/CARLISLE BARRACKS, PA

4 01/DEPARTMENT OF THE ARMY

5 01/BENATEC ASSOCIATES

6 01/BUILDING 122

7 08/CARLISLE

8 09/MAY/SEP////APR/OCT

9 10/CLTD-CLF

10 11///ZONE

11 LOAD - 1

12 19/1/COMBINED ECOS

13 20/1/1/SUB BSMT, BSMT W/1/45125/4/1//10

14 20/2/2/TOILETS, KITCHEN/1/3520/4/2//11

15 20/3/3/STAIRS/1/560/4/0//11

16 20/4/4/BSMT E/1/12424/4/3.3//12.7

17 20/5/5/1ST FL OFFICES/1/11724/4/1.3//12

18 20/6/6/1ST FL CEN OFFCS/1/9884/4/1.3//12

19 20/7/7/2ND FL OFFICES/1/14400/4/1.3//10.7

20 20/8/8/2ND FL CEN OFFCS/1/8674/4/0//10.7

21 20/9/9/3RD FL OFFICES/1/14400/4/1.3//11

22 20/10/10/3RD FL CEN OFFCS/1/8563/4/0//11

23 20/11/11/TOILETS W ROOF/1/580/4/2//11

24 20/12/12/STAIRS W ROOF/1/280/4/0//11

25 20/13/13/SUPPLY STORAGE/1/2544/4/0//12.7

26 20/14/14/1ST FL CEN OFFCS/9884/1/4/1.3//12

27 20/15/15/2ND FL CEN OFFCS/8674/1/4/0//10.7

28 20/16/16/3RD FL CEN OFFCS/8563/1/4/0//11

29 21/M////CBADCTX//CBADHTX

30 22/9/1/YES////14

31 22/10/1/YES////14

32 22/11/1/YES////14

33 22/12/1/YES////14

34 22/16/1/YES////14

35 24/2/1/9/10.3//134/45

36 24/2/2/10/10.3//134/315

37 24/3/1/16/11//135/45

38 24/3/2/48/11//135/135

39 24/3/3/16/11//135/225

40 24/5/1/108/11.3//134/45

41 24/5/2/281/11.3//134/135

42 24/5/3/93/11.3//134/225

43 24/5/4/235/11.3//134/315

44 24/6/1/9/11.3//134/45

45 24/6/2/27/11.3//134/135

46 24/6/3/22/11.3//134/225

47 24/6/4/56/11.3//134/315

48 24/7/1/135/10//134/45

49 24/7/2/320/10//134/135

50 24/7/3/135/10//134/225

51 24/7/4/344/10//134/315

52 24/8/1/8/10//134/135

53 24/8/2/8/10//134/315

54 24/9/1/135/10.3//134/45

55 24/9/2/320/10.3//134/135

56 24/9/3/135/10.3//134/225

57 24/9/4/344/10.3//134/315

58 24/10/1/8/10.3//134/135

CONTENTS OF : E:\CB122C.TM

LINE #	
59	24/10/2/8/10.3//134/315
60	24/12/1/8/10.3//135/45
61	24/12/2/24/10.3//135/135
62	24/12/3/8/10.3//135/225
63	24/14/1/9/11.3//134/45
64	24/14/2/27/11.3//134/135
65	24/14/3/22/11.3//134/225
66	24/14/4/56/11.3//134/315
67	24/15/1/8/10//134/135
68	24/15/2/8/10//134/315
69	24/16/1/8/10.3//134/135
70	24/16/2/8/10.3//134/315
71	25/2/1/8.5/2.5/1/.55/.29
72	25/3/1/8.5/2.5/6/.55/.29
73	25/3/3/8.5/2.5/6/.55/.29
74	25/5/1/8.5/2.5/5/.55/.29
75	25/5/2/8.5/2.5/35/.55/.29
76	25/5/3/8.5/2.5/6/.55/.29
77	25/5/4/8.5/2.5/28/.55/.29
78	25/6/1/8.5/2.5/5/.55/.29
79	25/6/2/8.5/2.5/7/.55/.29
80	25/7/1/7/2.5/6/.55/.29
81	25/7/2/7/2.5/40/.55/.29
82	25/7/3/7/2.5/6/.55/.29
83	25/7/4/7/2.5/40/.55/.29
84	25/8/1/7/2.5/3/.55/.29
85	25/8/2/7/2.5/3/.55/.29
86	25/9/1/7/2.5/6/.55/.29
87	25/9/2/7/2.5/40/.55/.29
88	25/9/3/7/2.5/6/.55/.29
89	25/9/4/7/2.5/40/.55/.29
90	25/10/1/7/2.5/3/.55/.29
91	25/10/2/7/2.5/3/.55/.29
92	25/12/1/7/2.5/3/.55/.29
93	25/12/3/7/2.5/3/.55/.29
94	25/14/1/8.5/2.5/5/.55/.29
95	25/14/2/8.5/2.5/7/.55/.29
96	25/15/1/7/2.5/3/.55/.29
97	25/15/2/7/2.5/3/.55/.29
98	25/16/1/7/2.5/3/.55/.29
99	25/16/2/7/2.5/3/.55/.29
100	26/1/CBAPD&L/CBAPD&L/CBAPDFAN/OFF/CBAPDFAN/CBAPDFAN/OFF/OFF/OFF/OFF
101	26/2/CBAPD&L/CBAPD&L/OFF/AVAIL/CBAPDFAN/OFF/OFF/OFF/CBAPDFAN/OFF
102	26/3/CBAPD&L/CBAPD&L/CBAPDFAN/AVAIL/OFF/CBAPDFAN/OFF/OFF/OFF/OFF
103	26/4/CBAPD&L/CBAPD&L/CBAPDFAN/OFF/CBAPDFAN/CBAPDFAN/OFF/OFF/OFF/OFF
104	26/5/CBAPD&L/CBAPD&L/CBAPDFAN/AVAIL/OFF/CBAPDFAN/OFF/OFF/OFF/OFF
105	26/6/CBAPD&L/CBAPD&L/CBAPDFAN/AVAIL/OFF/CBAPDFAN/OFF/OFF/OFF/OFF
106	26/7/CBAPD&L/CBAPD&L/CBAPDFAN/AVAIL/OFF/CBAPDFAN/OFF/OFF/OFF/OFF
107	26/8/CBAPD&L/CBAPD&L/CBAPDFAN/AVAIL/OFF/CBAPDFAN/OFF/OFF/OFF/OFF
108	26/9/CBAPD&L/CBAPD&L/CBAPDFAN/AVAIL/OFF/CBAPDFAN/OFF/OFF/OFF/OFF
109	26/10/CBAPD&L/CBAPD&L/CBAPDFAN/AVAIL/OFF/CBAPDFAN/OFF/OFF/OFF/OFF
110	26/11/CBAPD&L/CBAPD&L/OFF/AVAIL/OFF/OFF/OFF/OFF/CBAPDFAN/OFF
111	26/12/CBAPD&L/CBAPD&L/CBAPDFAN/AVAIL/OFF/CBAPDFAN/OFF/OFF/OFF/OFF
112	26/13/CBAPD&L/CBAPD&L/OFF/AVAIL/OFF/OFF/OFF/OFF/OFF/OFF
113	26/14/CBAPD&L/CBAPD&L/CBAPDFAN/AVAIL/OFF/CBAPDFAN/OFF/OFF/OFF/OFF
114	26/15/CBAPD&L/CBAPD&L/CBAPDFAN/AVAIL/OFF/CBAPDFAN/OFF/OFF/OFF/OFF
115	26/16/CBAPD&L/CBAPD&L/CBAPDFAN/AVAIL/OFF/CBAPDFAN/OFF/OFF/OFF/OFF
116	27/M/420/SF-PERS/255/255/1.66/WATT-SF/ASHRAE2

CONTENTS OF : E:\CB122C.TM

LINE #	
117	29/1/30/PCT-MCLG/30/PCT-MHTG/0//0
118	29/2/0/PCT-MCLG/0/PCT-MHTG/0//0
119	29/3/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF
120	29/4/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF
121	29/5/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF
122	29/6/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF/50/PCT-MCLG
123	29/7/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF
124	29/8/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF/50/PCT-MCLG
125	29/9/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF
126	29/10/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF/50/PCT-MCLG
127	29/11/0/PCT-MCLG/0/PCT-MHTG/0/CFM-SF/0/CFM-SF
128	29/12/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF
129	29/13/0/PCT-MCLG/0/PCT-MHTG/.5/CFM-SF/.5/CFM-SF
130	29/14/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF
131	29/15/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF
132	29/16/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF
133	30/1/23725/CFM/23725/CFM
134	30/2/0/CFM/0/CFM/////14660/CFM
135	30/3/360/CFM/360/CFM
136	30/4/12450/CFM/12450/CFM
137	30/5/5505/CFM/5505/CFM
138	30/6/10028/CFM/10028/CFM
139	30/7/6535/CFM/6535/CFM
140	30/8/8914/CFM/8914/CFM
141	30/9/6855/CFM/6855/CFM
142	30/10/8914/CFM/8914/CFM
143	30/11/0/CFM/0/CFM/////3070/CFM
144	30/12/180/CFM/180/CFM
145	30/13/0/CFM/1835/CFM
146	30/14/10028/CFM/10028/CFM
147	30/15/8914/CFM/8914/CFM
148	30/16/8914/CFM/8914/CFM
149	31/1/1/535/10//135/SINE-FIT/80/50
150	31/1/2/656/12//135/SINE-FIT/80/50
151	31/4/1/279/12//135/SINE-FIT/80/50
152	31/13/1/136/12//135/SINE-FIT/80/50
153	SYSTEM - 1
154	39/1/COMBINED ECOS
155	40/1/TRH/ROADK
156	41/1/1/1/4/4
157	42/1/3/3/.65
158	44/1/////////60//CLG-HTG//RM-EXH
159	45/1/CBADCLG/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/CBADHTG/CBADFAN/OFF
160	40/2/SZ
161	41/2/2/2/11/11
162	42/2////.75//.75
163	44/2
164	45/2/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF
165	40/3/INDFP
166	41/3/3/3/5/5/7/7/9/9/12/12
167	42/3/8/8/1
168	44/3/////////60//CLG-HTG//RM-EXH
169	45/3/CBADCLG/CBADCLG/OFF/OFF/CBADCLG/OFF/CBADHTG/OFF/CBADFAN/CBADHTG
170	40/4/UH
171	41/4/13/13
172	42/4/.20
173	44/4
174	45/4/OFF/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF

CONTENTS OF : E:\CB122C.TM

LINE #	
175	40/5/DD
176	41/5/6/6/8/8/10/10
177	42/5/8/8/1
178	44/5/////////60//CLG-HTG//RM-EXH
179	45/5/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF
180	40/6/DD
181	41/6/14/16
182	42/6/8/8/1
183	45/6/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF
184	EQUIPMENT - 1
185	59/1/CARLISLE///COMBINED ECOS
186	60/1/1/BLKPLANT/1/1/3/3/5/6
187	60/2/2/BLKPLANT/2/2
188	62/1/EQ1001S/2/306/TONS
189	62/2/EQ1000
190	63/1/30/HP/30/HP/////1
191	65/1/1/1/1/1/3/3/5/6
192	65/2/2/1/1/3/6
193	65/3/3/2/2
194	66/1/1
195	66/2/2/2
196	67/1/EQ2101/1/30/HP/11874/MBH/2156/KW
197	67/2/EQ2101/1/25/HP/2620/MBH/2300/KW
198	67/3/EQ2000
199	69/1/EQ4003//EQ4003
200	69/2////////EQ4003
201	69/3/EQ4003//EQ4003
202	69/4
203	69/5/EQ4003//EQ4003
204	69/6/EQ4003//EQ4003
205	74/1/EQ5100/750/TONS/.031/KW-TON/T-WATER/CTOWER/2/50/50/PERCENT

Building 122
Trace Output File

933702

```
*****  
*****  
**  
**          TRACE 600 ANALYSIS          **  
**  
**          by          **  
**  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 122

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Relectance: 0.20
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 8:18:43 2/ 2/94
Dataset Name: CB122 .TM

AIRFLOW - ALTERNATIVE 1
BASE BUILDING

----- S Y S T E M S U M M A R Y -----

(Design Airflow Quantities)

System Number	System Type	Main					Auxil.	Room
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	TRH	10,853	36,175	36,175	36,175	10,853	0	0
2	SZ	0	17,730	17,730	17,730	0	0	17,730
3	INDFP	5,830	19,435	19,435	36,448	19,435	37,165	0
4	UH	0	0	1,835	0	0	0	0
5	DD	8,357	27,856	27,856	28,824	27,856	0	0
6	DD	8,357	27,856	27,856	28,824	9,325	0	0
Totals		33,397	129,052	130,887	148,000	67,468	37,165	17,730

CAPACITY - ALTERNATIVE 1
BASE BUILDING

----- S Y S T E M S U M M A R Y -----

(Design Capacity Quantities)

System Number	System Type	Cooling				Heating						
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	TRH	81.5	0.0	0.0	81.5	-68,182	0	-480,162	0	0	0	-548,345
2	SZ	3.2	0.0	0.0	3.2	-9,837	0	-106,277	0	0	0	-9,837
3	INDFP	46.4	102.4	0.0	148.8	-680,963	-1,230,942	0	0	0	0	-1,911,905
4	UH	0.0	0.0	0.0	0.0	-6,715	0	0	0	0	0	-6,715
5	DD	63.1	0.0	0.0	63.1	-457,597	0	-365,035	0	0	0	-822,632
6	DD	63.1	0.0	0.0	63.1	-245,454	0	-365,035	0	0	0	-610,489
Totals		257.3	102.4	0.0	359.7	-1,468,749	-1,230,942	-1,316,509	0	0	0	-3,909,922

The building peaked at hour 14 month 7 with a capacity of 257.3 tons

ENGINEERING CHECKS - ALTERNATIVE 1
BASE BUILDING

----- ENGINEERING CHECKS -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	----- Cooling -----				--- Heating ---		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	TRH	30.00	0.63	443.7	705.9	17.00	0.63	-9.53	57,549
2	Main	SZ	0.00	4.32	5,605.2	1,296.2	9.26	4.32	-2.40	4,100
3	Main	INDFP	30.00	0.47	418.7	891.2	13.46	0.47	-16.46	41,364
3	Auxiliary	INDFP	0.00	0.90	363.0	404.1	29.70	0.90	-29.76	41,364
4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.72	-2.64	2,544
5	Main	DD	30.00	1.03	441.4	429.7	27.92	1.03	-30.33	27,121
6	Main	DD	30.00	1.03	441.4	429.7	27.92	1.03	-22.51	27,121

System 1 Peak TRH - TERMINAL REHEAT

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Wall Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Partition	18,940			18,940	1.94	*	18,940	4.00	*	-68,182	-68,182	100.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	18,940	0		18,940	1.94	*	18,940	4.00	*	-68,182	-68,182	100.00
Internal Loads						*			*			
Lights	398,781	0		398,781	40.76	*	424,020	89.45	*	0	0	0.00
People	63,941			63,941	6.54	*	31,097	6.56	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	462,722	0	0	462,722	47.30	*	455,117	96.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	406,913	41.59	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				77,173	7.89	*		0.00	*		0	0.00
Ret. Fan Heat		18,007		18,007	1.84	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	-0.00	*	0	-0.00	*	0	0	0.00
Exhaust Heat		-5,402	0	-5,402	-0.55	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	481,661	12,605	0	978,353	100.00	*	474,057	100.00	*	-68,182	-68,182	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	81.5	978.4	719.6	36,175	80.0 67.5 83.9	61.0 59.3 74.8	57,549	
Aux Clg	0.0	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	16,570	
Opt Vent	0.0	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0	
Totals	81.5	978.4					0	0 0

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	30.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent	10,853	0	Clg Cfm/Sqft	0.63	SAOB	63.0	69.7
Main Htg	-68.2	36,175	68.0	69.7	Infil	0	0	Clg Cfm/Ton	443.70	Plenum	75.0	68.0
Aux Htg	0.0	0	0.0	0.0	Supply	36,175	36,175	Clg Sqft/Ton	705.87	Return	75.5	68.0
Preheat	-480.2	36,175	48.8	61.0	Mincfm	36,175	0	Clg Btuh/Sqft	17.00	Ret/OA	80.0	68.0
Reheat	-0.0	0	0.0	0.0	Return	36,175	36,175	No. People	137	Runarnd	75.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	10,853	0	Htg % OA	0.0	Fn MtrTD	0.5	0.5
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	0.63	Fn BldTD	0.4	0.4
Total	-548.3				Auxil	0	0	Htg Btuh/Sqft	-9.53	Fn Frict	1.1	1.1

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 2 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==> Mo/Hr: 7/16 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	860		860	2.26	*	0	0.00	*	0	-3,224	44.57
Glass Solar	595	0		595	1.57	*	595	1.71	*	0	0	0.00
Glass Cond	239	0		239	0.63	*	239	0.69	*	-1,139	-1,139	15.75
Wall Cond	747	183		929	2.45	*	747	2.14	*	-2,286	-2,870	39.68
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	1,581	1,042		2,623	6.91	*	1,581	4.54	*	-3,426	-7,234	100.00
Internal Loads						*			*			
Lights	30,623	0		30,623	80.68	*	30,623	87.96	*	0	0	0.00
People	4,712			4,712	12.41	*	2,223	6.38	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	35,335	0	0	35,335	93.09	*	32,845	94.34	*	0	0	0.00
Ceiling Load	1,918	-1,918		0	0.00	*	389	1.12	*	-243	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	-0.00	*	0	-0.00	*	0	0	-0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	38,834	-876	0	37,958	100.00	*	34,815	100.00	*	-3,668	-7,234	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor		
Main Clg-	3.2	38.0	35.5	17,730	76.6	68.9	96.8	73.2	68.3	99.1	4,100	
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0	
Totals	3.2	38.0									580	0 0
											196	21 11

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	--ENGINEERING CHECKS--			--TEMPERATURES (F)--		
	(Mbh)	(cfm)	Deg F	Deg F				Clg % OA			Type	Clg	Htg
Main Htg	-9.8	17,730	67.7	68.2	Vent	0	0	Clg Cfm/Sqft	4.32	0.0	SADB	73.2	68.2
Aux Htg	0.0	0	0.0	0.0	Infil	0	0	Clg Cfm/Ton	5605.16		Plenum	76.5	67.7
Preheat	-106.3	17,730	67.7	73.2	Supply	17,730	17,730	Clg Sqft/Ton	1296.17		Return	79.7	67.7
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	9.26		Ret/OA	76.6	67.7
Humidif	0.0	0	0.0	0.0	Return	0	17,730	No. People	10		Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0		Fn MtrTD	0.0	0.0
Total	-9.8				Rm Exh	17,730	0	Htg Cfm/Sqft	4.32		Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/Sqft	-2.40		Fn Frict	0.0	0.0

System 3 Block INDFP - 4-PIPE INDUCTION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/19 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 85 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	474	21,484		21,957	1.22	*	664	0.10	*	-1,579	-73,446	3.84
Glass Solar	171,927	0		171,927	9.54	*	185,822	27.51	*	0	0	0.00
Glass Cond	53,830	0		53,830	2.99	*	40,082	5.93	*	-276,287	-276,287	14.45
Wall Cond	113,330	16,902		130,232	7.22	*	168,977	25.01	*	-328,407	-377,319	19.74
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	736,354			736,354	40.85	*	170,578	25.25	*	-1,184,852	-1,184,852	61.97
Sub Total==>	1,075,915	38,386		1,114,301	61.81	*	566,123	83.80	*	-1,791,125	-1,911,905	100.00
Internal Loads												
Lights	277,628	0		277,628	15.40	*	79,744	11.80	*	0	0	0.00
People	45,248			45,248	2.51	*	6,070	0.90	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	322,876	0	0	322,876	17.91	*	85,814	12.70	*	0	0	0.00
Ceiling Load	14,654	-14,654		0	0.00	*	23,486	3.48	*	-47,811	0	0.00
Outside Air	0	0	0	252,361	14.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				110,564	6.13	*		0.00	*		0	0.00
Ret. Fan Heat		13,820		13,820	0.77	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	119			119	0.01	*	119	0.02	*	0	0	0.00
Exhaust Heat		-11,266	0	-11,266	-0.62	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	1,413,564	26,287	0	1,802,776	100.00	*	675,542	100.00	*	-1,838,936	-1,911,905	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	46.4	557.0	402.9	80.9 66.7 78.0	59.9 57.7 69.7	Part	0	
Aux Clg	102.4	1,228.4	771.3	75.0 64.2 74.9	65.1 53.2 42.8	ExFlr	0	
Opt Vent	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	Roof	14,680	0 0
Totals	148.8	1,785.4				Wall	28,354	5,152 18

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	30.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent	5,830	0	Clg Cfm/Sqft	0.47	SADB	65.1	96.7
Main Htg	-681.0	19,435	64.5	96.7	Infil	17,013	17,013	Clg Cfm/Ton	418.73	Plenum	76.1	64.4
Aux Htg	-1,230.9	37,165	68.0	98.5	Supply	19,435	19,435	Clg Sqft/Ton	891.20	Return	76.8	64.5
Preheat	-0.0	19,435	64.5	59.9	Mincfm	0	0	Clg Btuh/Sqft	13.46	Ret/OA	80.9	64.5
Reheat	0.0	0	0.0	0.0	Return	19,435	19,435	No. People	98	Runarnd	75.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	5,830	0	Htg % OA	0.0	Fn MtrTD	1.3	1.3
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	0.47	Fn BldTD	1.0	1.0
Total	-1,911.9				Auxil	37,165	37,165	Htg Btuh/Sqft	-16.46	Fn Frict	2.9	2.9

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 4 Block UH - UNIT HEATERS

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Percent Of Tot (%)	*	Space Sensible (Btuh)	Percent Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Percent Of Tot (%)
Envelope Loads						*			*			
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Wall Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Partition	0			0	0.00	*	0	0.00	*	-6,715	-6,715	100.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-6,715	-6,715	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-6,715	-6,715	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total	Glass (sf)	(%)
Main Clg-	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Floor	2,544	
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Part	1,632	
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	0	
Totals	0.0	0.0				Roof	0	0 0
						Wall	0	0 0

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	Clg % DA	0.0	Type	Clg	Htg
Main Htg	-6.7	1,835	68.0	71.4	Vent	0	0	Clg Cfm/Sqft	0.00	SADB	0.0	71.4
Aux Htg	0.0	0	0.0	0.0	Infil	0	0	Clg Cfm/Ton	0.00	Plenum	0.0	68.0
Preheat	0.0	0	0.0	0.0	Supply	0	1,835	Clg Sqft/Ton	0.00	Return	0.0	68.0
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/DA	0.0	68.0
Humidif	0.0	0	0.0	0.0	Return	0	1,835	No. People	0	Runarnd	0.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % DA	0.0	Fn MtrTD	0.0	0.0
Total	-6.7				Rm Exh	0	0	Htg Cfm/SqFt	0.72	Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/Sqft	-2.64	Fn Frict	0.1	0.0

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 5 Block DD - DOUBLE DUCT

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	14,486	0		14,486	1.91	*	16,221	5.75	*	-48,286	-48,286	21.28
Glass Solar	17,909	0		17,909	2.36	*	16,285	5.78	*	0	0	0.00
Glass Cond	4,840	0		4,840	0.64	*	5,167	1.83	*	-24,690	-24,690	10.88
Wall Cond	4,161	526		4,687	0.62	*	5,622	1.99	*	-16,677	-18,921	8.34
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	33,323			33,323	4.40	*	16,324	5.79	*	-67,403	-67,403	29.70
Sub Total==>	74,719	526		75,245	9.94	*	59,619	21.14	*	-157,056	-159,300	70.19
Internal Loads						*			*			
Lights	190,447	0		190,447	25.15	*	200,839	71.22	*	0	0	0.00
People	30,203			30,203	3.99	*	14,612	5.18	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	220,650	0	0	220,650	29.13	*	215,452	76.40	*	0	0	0.00
Ceiling Load	1,375	-1,375		0	0.00	*	1,553	0.55	*	-4,627	0	0.00
Outside Air	0	0	0	287,738	37.99	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				158,470	20.92	*		0.00	*		0	0.00
Ret. Fan Heat		19,809		19,809	2.62	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	5,366			5,366	0.71	*	5,366	1.90	*	-67,648	-67,648	29.81
Exhaust Heat		-9,934	0	-9,934	-1.31	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	-0.00	*		0.00	*		0	0.00
Grand Total==>	302,110	9,026	0	757,343	100.00	*	281,990	100.00	*	-229,331	-226,948	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	63.1	757.3	577.1	27,856 80.4 68.3 87.0	60.5 60.1 79.2	27,121		
Aux Clg	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Opt Vent	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	63.1	757.3				8,563	0	0
						1,613	460	29

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	30.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent	8,357	0	Clg Cfm/Sqft	1.03	SADB	65.7	75.6
Main Htg	-457.6	27,856	60.5	75.6	Infil	968	968	Clg Cfm/Ton	441.37	Plenum	75.4	66.5
Aux Htg	0.0	0	0.0	0.0	Supply	27,856	27,856	Clg Sqft/Ton	429.73	Return	76.1	67.5
Preheat	-365.0	27,856	48.4	60.5	Mincfm	0	0	Clg Btuh/Sqft	27.92	Ret/OA	80.4	67.5
Reheat	0.0	0	0.0	0.0	Return	27,856	27,856	No. People	65	Runarnd	75.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	8,357	0	Htg % OA	0.0	Fn MtrTD	1.3	1.3
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	1.03	Fn BldTD	1.0	1.0
Total	-822.6				Auxil	0	0	Htg Btuh/Sqft	-30.33	Fn Frict	2.9	2.9

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 6 Block DD - DOUBLE DUCT

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	14,486	0		14,486	1.91	*	16,221	5.75	*	-48,286	-48,286	21.28
Glass Solar	17,909	0		17,909	2.36	*	16,285	5.78	*	0	0	0.00
Glass Cond	4,840	0		4,840	0.64	*	5,167	1.83	*	-24,690	-24,690	10.88
Wall Cond	4,161	526		4,687	0.62	*	5,622	1.99	*	-16,677	-18,921	8.34
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	33,323			33,323	4.40	*	16,324	5.79	*	-67,403	-67,403	29.70
Sub Total==>	74,719	526		75,245	9.94	*	59,619	21.14	*	-157,056	-159,300	70.19
Internal Loads						*			*			
Lights	190,447	0		190,447	25.15	*	200,839	71.22	*	0	0	0.00
People	30,203			30,203	3.99	*	14,612	5.18	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	220,650	0	0	220,650	29.13	*	215,452	76.40	*	0	0	0.00
Ceiling Load	1,375	-1,375		0	0.00	*	1,553	0.55	*	-4,627	0	0.00
Outside Air	0	0	0	287,738	37.99	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				158,470	20.92	*		0.00	*		0	0.00
Ret. Fan Heat		19,809		19,809	2.62	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	5,366			5,366	0.71	*	5,366	1.90	*	-67,648	-67,648	29.81
Exhaust Heat		-9,934	0	-9,934	-1.31	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	-0.00	*		0.00	*		0	0.00
Grand Total==>	302,110	9,026	0	757,343	100.00	*	281,990	100.00	*	-229,331	-226,948	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg-	63.1	757.3	577.1	27,856 80.4 68.3 87.0	60.5 60.1 79.2	27,121		
Aux Clg	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Opt Vent	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	63.1	757.3				8,563	0	0
						1,613	460	29

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	30.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F								
Main Htg	-245.5	27,856	67.5	75.6	Vent	8,357	0	Clg Cfm/Sqft	1.03	SADB	65.7	75.6
Aux Htg	0.0	0	0.0	0.0	Infil	968	968	Clg Cfm/Ton	441.37	Plenum	75.4	66.5
Preheat	-365.0	27,856	48.4	60.5	Supply	27,856	27,856	Clg Sqft/Ton	429.73	Return	76.1	67.5
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	27.92	Ret/OA	80.4	67.5
Humidif	0.0	0	0.0	0.0	Return	27,856	27,856	No. People	65	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	8,357	0	Htg % OA	0.0	Fn MtrTD	1.3	1.3
Total	-610.5				Rm Exh	0	0	Htg Cfm/SqFt	1.03	Fn BldTD	1.0	1.0
					Auxil	0	0	Htg Btuh/SqFt	-22.51	Fn Frict	2.9	2.9

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

BUILDING U-VALUES - ALTERNATIVE 1
BASE BUILDING

----- B U I L D I N G U - V A L U E S -----

Room Number	Description	Room U-Values (Btu/hr/sqft/F)									Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
		Part.	ExFlr	Summr Skylt	Wintr Skylt	Roof	Summr Windo	Wintr Windo	Wall	Ceil.		
1	SUB BSMT, BSMT W	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
Zone	1 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
4	BSMT E	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
Zone	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
System	1 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.4	9.54
2	TOILETS, KITCHEN	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	29.4	5.93
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	29.4	5.93
11	TOILETS W ROOF	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
Zone	11 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	35.3	7.23
3	STAIRS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.229	0.000	103.3	21.63
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.229	0.000	103.3	21.63
5	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	57.9	12.05
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	57.9	12.05
7	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	56.7	11.81
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	56.7	11.81
9	3RD FL OFFICES	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	102.3	21.84
Zone	9 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	102.3	21.84
12	STAIRS W ROOF	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.229	0.000	146.4	31.13
Zone	12 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.229	0.000	146.4	31.13
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.256	0.317	74.1	15.63
13	SUPPLY STORAGE	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
Zone	13 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
System	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
6	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
8	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
10	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
Zone	10 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
System	5 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	43.1	8.94
14	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
Zone	14 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
15	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
Zone	15 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
16	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
Zone	16 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
System	6 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	43.1	8.94
Building		0.229	0.000	0.000	0.000	0.088	0.810	0.837	0.256	0.317	52.6	10.93

BUILDING AREAS - ALTERNATIVE 1
BASE BUILDING

----- B U I L D I N G A R E A S -----

Room Number	Description	Number of Duplicate Flr	Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	SkI /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	SUB BSMT, BSMT W	1	1	45,125	45,125	13,222	0	0	0	0	0	0	0
Zone	1 Total/Ave.				45,125	13,222	0	0	0	0	0	0	0
4	BSMT E	1	1	12,424	12,424	3,348	0	0	0	0	0	0	0
Zone	4 Total/Ave.				12,424	3,348	0	0	0	0	0	0	0
System	1 Total/Ave.				57,549	16,570	0	0	0	0	0	0	0
2	TOILETS, KITCHEN	1	1	3,520	3,520	0	0	0	0	0	21	11	174
Zone	2 Total/Ave.				3,520	0	0	0	0	0	21	11	174
11	TOILETS W ROOF	1	1	580	580	0	0	0	0	580	0	0	0
Zone	11 Total/Ave.				580	0	0	0	0	580	0	0	0
System	2 Total/Ave.				4,100	0	0	0	0	580	21	11	174
3	STAIRS	1	1	560	560	0	0	0	0	0	255	29	625
Zone	3 Total/Ave.				560	0	0	0	0	0	255	29	625
5	1ST FL OFFICES	1	1	11,724	11,724	0	0	0	0	0	1,573	19	6,530
Zone	5 Total/Ave.				11,724	0	0	0	0	0	1,573	19	6,530
7	2ND FL OFFICES	1	1	14,400	14,400	0	0	0	0	0	1,610	17	7,730
Zone	7 Total/Ave.				14,400	0	0	0	0	0	1,610	17	7,730
9	3RD FL OFFICES	1	1	14,400	14,400	0	0	0	0	14,400	1,610	17	8,010
Zone	9 Total/Ave.				14,400	0	0	0	0	14,400	1,610	17	8,010
12	STAIRS W ROOF	1	1	280	280	0	0	0	0	280	105	25	307
Zone	12 Total/Ave.				280	0	0	0	0	280	105	25	307
System	3 Total/Ave.				41,364	0	0	0	0	14,680	5,152	18	23,202
13	SUPPLY STORAGE	1	1	2,544	2,544	1,632	0	0	0	0	0	0	0
Zone	13 Total/Ave.				2,544	1,632	0	0	0	0	0	0	0
System	4 Total/Ave.				2,544	1,632	0	0	0	0	0	0	0
6	1ST FL CEN OFFCS	1	1	9,884	9,884	0	0	0	0	0	250	19	1,038
Zone	6 Total/Ave.				9,884	0	0	0	0	0	250	19	1,038
8	2ND FL CEN OFFCS	1	1	8,674	8,674	0	0	0	0	0	105	66	55
Zone	8 Total/Ave.				8,674	0	0	0	0	0	105	66	55
10	3RD FL CEN OFFCS	1	1	8,563	8,563	0	0	0	0	8,563	105	64	60
Zone	10 Total/Ave.				8,563	0	0	0	0	8,563	105	64	60
System	5 Total/Ave.				27,121	0	0	0	0	8,563	460	29	1,153
14	1ST FL CEN OFFCS	1	1	9,884	9,884	0	0	0	0	0	250	19	1,038
Zone	14 Total/Ave.				9,884	0	0	0	0	0	250	19	1,038
15	2ND FL CEN OFFCS	1	1	8,674	8,674	0	0	0	0	0	105	66	55
Zone	15 Total/Ave.				8,674	0	0	0	0	0	105	66	55
16	3RD FL CEN OFFCS	1	1	8,563	8,563	0	0	0	0	8,563	105	64	60
Zone	16 Total/Ave.				8,563	0	0	0	0	8,563	105	64	60
System	6 Total/Ave.				27,121	0	0	0	0	8,563	460	29	1,153
Building					159,799	18,202	0	0	0	32,386	6,095	19	25,681

ASHRAE 90 ANALYSIS - ALTERNATIVE 1
BASE BUILDING

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.088 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.362 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.224 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.96 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTVw) = 24.46 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1
BASE BUILDING

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	18.0	0	0	-200,810	13	170	6,544.3	0	0	0.0	0	0
5 - 10	36.0	0	4	-401,620	10	129	13,088.7	0	0	0.0	0	0
10 - 15	54.0	9	94	-602,430	7	91	19,633.1	0	0	0.0	0	0
15 - 20	71.9	7	78	-803,240	3	34	26,177.4	0	0	0.0	0	0
20 - 25	89.9	9	92	-1,004,050	5	68	32,721.7	0	0	0.0	0	0
25 - 30	107.9	10	108	-1,204,860	5	59	39,266.1	0	0	0.0	0	0
30 - 35	125.9	8	90	-1,405,670	9	114	45,810.5	0	0	0.0	0	0
35 - 40	143.9	19	208	-1,606,480	27	346	52,354.8	0	0	0.0	0	0
40 - 45	161.9	3	34	-1,807,290	15	187	58,899.2	0	0	0.0	0	0
45 - 50	179.8	5	53	-2,008,100	7	90	65,443.5	0	0	0.0	0	0
50 - 55	197.8	6	67	-2,208,910	0	0	71,987.9	0	0	0.0	0	0
55 - 60	215.8	4	42	-2,409,720	0	0	78,532.2	0	0	0.0	0	0
60 - 65	233.8	3	35	-2,610,530	0	0	85,076.6	0	0	0.0	0	0
65 - 70	251.8	7	75	-2,811,340	0	0	91,620.9	0	0	0.0	0	0
70 - 75	269.8	7	75	-3,012,150	0	0	98,165.3	0	0	0.0	0	0
75 - 80	287.8	1	15	-3,212,960	0	0	104,709.6	0	0	0.0	0	0
80 - 85	305.7	0	0	-3,413,770	0	0	111,254.0	0	0	0.0	0	0
85 - 90	323.7	0	0	-3,614,580	0	0	117,798.3	100	2,520	0.0	0	0
90 - 95	341.7	0	0	-3,815,390	0	0	124,342.7	0	0	0.0	0	0
95 - 100	359.7	0	0	-4,016,200	0	0	130,887.0	0	0	0.0	0	0
Hours Off	0.0	0	7,690	0	0	7,472	0.0	0	6,240	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1
BASE BUILDING

----- B U I L D I N G T E M P E R A T U R E P R O F I L E S -----

Temperature Range (F)	----- Zone Number -----															
	1	4	2	11	3	5	7	9	12	13	6	8	10	14	15	16
Max. Temp.	82.6	81.5	201.1	120.2	86.4	85.1	84.9	83.3	85.3	96.2	85.1	88.5	84.5	85.1	88.5	84.5
Mo./Hr.	10 21	10 23	9 19	8 16	7 20	7 24	7 24	7 22	7 20	8 17	7 3 10	1 7 6	7 3 10	1 7 6	1 7 6	1 7 6
Day Type	2	2	2	2	4	1	1	4	4	2	5	2	5	5	2	5
..... Number of Hours																
Above 100	0	0	8,016	4,086	0	0	0	0	0	0	0	0	0	0	0	0
95 - 100	0	0	0	110	0	0	0	0	0	240	0	0	0	0	0	0
90 - 95	0	0	91	1,239	0	0	0	0	0	1,494	0	0	0	0	0	0
85 - 90	0	0	290	253	118	0	0	0	36	1,602	20	537	0	20	537	0
80 - 85	954	517	227	585	1,161	1,221	1,140	704	1,182	1,215	1,939	3,376	1,585	1,939	3,338	1,585
75 - 80	5,027	2,814	136	327	1,752	1,952	2,042	2,359	1,875	818	2,990	4,355	3,761	3,014	4,263	3,756
70 - 75	1,202	3,711	0	1,256	631	601	524	694	596	1,435	1,380	492	1,340	1,238	595	1,333
65 - 70	1,418	1,516	0	726	1,391	1,535	1,595	1,677	1,447	1,579	1,283	0	1,476	1,313	27	1,400
60 - 65	159	202	0	178	1,107	1,076	1,088	1,366	1,166	377	523	0	446	580	0	504
55 - 60	0	0	0	0	915	869	900	789	953	0	276	0	152	293	0	182
50 - 55	0	0	0	0	671	632	626	546	658	0	349	0	0	363	0	0
Below 50	0	0	0	0	1,014	874	845	625	847	0	0	0	0	0	0	0
Min. Temp.	63.8	63.0	68.0	63.6	34.0	34.6	34.7	37.4	35.6	61.7	50.6	67.9	57.7	50.3	67.9	57.5
Mo./Hr.	1 8	1 10	1 1	2 6	2 11	2 7	2 7	2 7	2 7	1 6	2 7	1 7	1 7	2 7	1 7	1 7
Day Type	5	5	1	5	4	5	5	5	5	5	5	1	5	5	1	5

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1
BASE BUILDING

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	STEAM	STEAM DMND	
	Off Peak (kWh)	On Peak (kW)	On Peak (Therm)	WATER (1000 G1)	On Peak (Thrm/hr)
Jan	163,358	813	12,170	0	72
Feb	147,800	813	11,503	0	72
March	178,338	813	8,726	0	65
April	149,213	813	2,215	0	47
May	191,208	948	0	72	0
June	197,998	1,020	0	117	0
July	196,533	1,068	0	192	0
Aug	208,320	1,021	0	129	0
Sept	174,233	971	0	67	0
Oct	163,049	813	1,307	0	46
Nov	152,314	813	4,498	0	58
Dec	155,579	813	10,219	0	71
Total	2,077,943	1,068	50,638	578	72

Building Energy Consumption = 76,070 (Btu/Sq Ft/Year)
Source Energy Consumption = 175,408 (Btu/Sq Ft/Year)

Floor Area = 159,799 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION

Ref Num	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	78913	71397	86428	75155	82671	82671	75155	86428	75155	82671	75155	75155	946,954
	PK	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7
1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH2O	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1001S		2-STG CTV <555 TONS											
	ELEC	0	0	0	0	13792	20583	35246	22840	12946	0	0	0	105,407
	PK	0.0	0.0	0.0	0.0	106.5	178.5	226.8	179.2	129.8	0.0	0.0	0.0	226.8
1	EQ5100		COOLING TOWER											
	ELEC	0	0	0	0	5115	5115	4650	5348	4650	0	0	0	24,878
	PK	0.0	0.0	0.0	0.0	23.3	23.3	23.3	23.3	23.3	0.0	0.0	0.0	23.3
1	EQ5100		COOLING TOWER											
	WATER	0	0	0	0	72	117	192	129	67	0	0	0	578
	PK	0.0	0.0	0.0	0.0	0.6	1.0	1.2	1.0	0.8	0.0	0.0	0.0	1.2
1	EQ5001		CHILLED WATER PUMP C.V.											
	ELEC	0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
	PK	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5010		CONDENSER WATER PUMP C.V.											
	ELEC	0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
	PK	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5300		CONTROL PANEL & INTERLOCK											

	ELEC	0	0	0	0	220	220	200	230	200	0	0	1,070
	PK	0.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	1.0
2	EQ1000												
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5001												
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5010												
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ4003												
	ELEC	9754	8825	10683	9290	10219	10219	9290	10683	9290	10219	9290	117,051
	PK	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4
1	EQ4003												
	ELEC	2276	2059	2493	2168	2384	2384	2168	2493	2168	2384	2168	27,312
	PK	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
2	EQ4003												
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	EQ4003												
	ELEC	13975	12644	15305	13309	14640	14640	13309	15305	13309	14640	13309	167,695
	PK	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5
3	EQ4003												
	ELEC	1747	1580	1913	1664	1830	1830	1664	1913	1664	1830	1664	20,962
	PK	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
5	EQ4003												
	ELEC	20030	18122	21937	19076	20983	20983	19076	21937	19076	20983	19076	240,355
	PK	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4
5	EQ4003												
	ELEC	2504	2265	2742	2384	2623	2623	2384	2742	2384	2623	2384	30,044
	PK	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9
6	EQ4003												
	ELEC	20030	18122	21937	19076	20983	20983	19076	21937	19076			

[illegible]

UTILITY PEAK CHECKSUMS - ALTERNATIVE 1
BASE BUILDING

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 1,068.1 (kW)
Yearly Time of Peak 14 (hr) 7 (mo)

Hour 14 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Percent Of Tot (%)
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Cooling Equipment

1	EQ1001S	2-STG CTV <555 TONS	310.7	29.09
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Sub Total			310.7	29.09
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Sub Total			0.0	0.00
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Air Moving Equipment

1		SUMMATION OF FAN ELECTRICAL DEMAND	57.3	5.36
3		SUMMATION OF FAN ELECTRICAL DEMAND	74.9	7.01
5		SUMMATION OF FAN ELECTRICAL DEMAND	107.3	10.05
6		SUMMATION OF FAN ELECTRICAL DEMAND	107.3	10.05

Sub Total			346.8	32.46
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Sub Total			0.0	0.00
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Miscellaneous

Lights			410.7	38.45
Base Utilities			0.0	0.00
Misc Equipment			0.0	0.00
Sub Total			410.7	38.45

Grand Total			1,068.1	100.00
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**          T R A C E    6 0 0    A N A L Y S I S          **  
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 122

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Relectance: 0.20
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 8:42:45 2/ 2/94
Dataset Name: CB122 .TM

AIRFLOW - ALTERNATIVE 2
DOUBLE GLAZED WINDOWS

----- S Y S T E M S U M M A R Y -----
(Design Airflow Quantities)

System Number	System Type	Main					Auxil. Supply	Room Exhaust
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Airflow (Cfm)	Airflow (Cfm)
1	TRH	10,853	36,175	36,175	36,175	10,853	0	0
2	SZ	0	17,670	17,670	17,670	0	0	17,730
3	INDFP	5,830	19,435	19,435	34,463	19,435	34,668	0
4	UH	0	0	1,835	0	0	0	0
5	DD	8,357	27,856	27,856	28,711	27,856	0	0
6	DD	8,357	27,856	27,856	28,711	9,212	0	0
Totals		33,397	128,992	130,827	145,730	67,355	34,668	17,730

CAPACITY - ALTERNATIVE 2
DOUBLE GLAZED WINDOWS

----- S Y S T E M S U M M A R Y -----
(Design Capacity Quantities)

System Number	System Type	Cooling					Heating					
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	TRH	81.5	0.0	0.0	81.5	-63,182	0	-480,162	0	0	0	-548,345
2	SZ	3.2	0.0	0.0	3.2	-9,461	0	-105,950	0	0	0	-9,461
3	INDFP	45.0	92.8	0.0	137.7	-590,294	-1,092,710	0	0	0	0	-1,683,004
4	UH	0.0	0.0	0.0	0.0	-6,715	0	0	0	0	0	-6,715
5	DD	62.3	0.0	0.0	62.3	-422,817	0	-370,128	0	0	0	-792,945
6	DD	62.3	0.0	0.0	62.3	-215,767	0	-370,128	0	0	0	-585,894
Totals		254.3	92.8	0.0	347.1	-1,313,236	-1,092,710	-1,326,368	0	0	0	-3,626,363

The building peaked at hour 14 month 7 with a capacity of 254.3 tons

ENGINEERING CHECKS - ALTERNATIVE 2
DOUBLE GLAZED WINDOWS

----- ENGINEERING CHECKS -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	----- Cooling -----				--- Heating ---		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	TRH	30.00	0.63	443.7	705.9	17.00	0.63	-9.53	57,549
2	Main	SZ	0.00	4.31	5,606.9	1,301.0	9.22	4.31	-2.31	4,100
3	Main	INDFP	30.00	0.47	432.2	919.8	13.05	0.47	-14.27	41,364
3	Auxiliary	INDFP	0.00	0.84	373.8	446.0	26.91	0.84	-26.42	41,364
4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.72	-2.64	2,544
5	Main	DD	30.00	1.03	446.9	435.1	27.58	1.03	-29.24	27,121
6	Main	DD	30.00	1.03	446.9	435.1	27.58	1.03	-21.60	27,121

System 1 Peak TRH - TERMINAL REHEAT

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Percent		Space	Percent		Space Peak	Coil Peak	Percent
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Wall Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Partition	18,940			-18,940	1.94	*	18,940	4.00	*	-68,182	-68,182	100.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	18,940	0		18,940	1.94	*	18,940	4.00	*	-68,182	-68,182	100.00
Internal Loads												
Lights	398,781	0		398,781	40.76	*	424,020	89.45	*	0	0	0.00
People	63,941			63,941	6.54	*	31,097	6.56	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	462,722	0	0	462,722	47.30	*	455,117	96.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	406,913	41.59	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				77,173	7.89	*		0.00	*		0	0.00
Ret. Fan Heat		18,007		18,007	1.84	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	-0.00	*	0	-0.00	*	0	0	0.00
Exhaust Heat		-5,402	0	-5,402	-0.55	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	481,661	12,605	0	978,353	100.00	*	474,057	100.00	*	-68,182	-68,182	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	81.5	978.4	719.6	36,175 80.0 67.5 83.9	61.0 59.3 74.8	Part	16,570	
Aux Clg	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	0	
Opt Vent	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	Roof	0	0 0
Totals	81.5	978.4				Wall	0	0 0

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	30.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent	10,853	0	Clg Cfm/Sqft	0.63	SADB	63.0	69.7
Main Htg	-68.2	36,175	68.0	69.7	Infil	0	0	Clg Cfm/Ton	443.70	Plenum	75.0	68.0
Aux Htg	0.0	0	0.0	0.0	Supply	36,175	36,175	Clg Sqft/Ton	705.87	Return	75.5	68.0
Preheat	-480.2	36,175	48.8	61.0	Mincfm	36,175	0	Clg Btuh/Sqft	17.00	Ret/OA	80.0	68.0
Reheat	-0.0	0	0.0	0.0	Return	36,175	36,175	No. People	137	Runarnd	75.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	10,853	0	Htg % OA	0.0	Fn MtrTD	0.5	0.5
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	0.63	Fn BldTD	0.4	0.4
Total	-548.3				Auxil	0	0	Htg Btuh/Sqft	-9.53	Fn Frict	1.1	1.1

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

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***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==>           Mo/Hr: 7/16           *           Mo/Hr: 7/16           *           Mo/Hr: 13/ 1
Outside Air ==>           OADB/WB/HR: 91/ 73/ 98.0   *           OADB: 91           *           OADB: 4
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-----HEATING COIL SELECTION-----					-----AIRFLOWS (cfm)-----			--ENGINEERING CHECKS--		--TEMPERATURES (F)---		
	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F				Clg Cfm/Sqft	4.31	SADB	73.2	68.2
Main Htg	-9.5	17,670	67.7	68.2	Infil	0	0	Clg Cfm/Ton	5606.95	Plenum	76.5	67.7
Aux Htg	0.0	0	0.0	0.0	Supply	17,670	17,670	Clg Sqft/Ton	1300.99	Return	79.7	67.7
Preheat	-106.0	17,670	67.7	73.2	Mincfm	0	0	Clg Btuh/Sqft	9.22	Ret/OA	76.6	67.7
Reheat	0.0	0	0.0	0.0	Return	0	17,670	No. People	10	Runarnd	75.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	17,730	0	Htg Cfm/Sqft	4.31	Fn BldTD	0.0	0.0
Total	-9.5				Auxil	0	0	Htg Btuh/Sqft	-2.31	Fn Frict	0.0	0.0

System 3 Block INDFP - 4-PIPE INDUCTION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/20 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 83 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	474	21,484		21,957	1.31	*	740	0.13	*	-1,579	-73,446	4.36
Glass Solar	154,605	0		154,605	9.19	*	138,868	24.40	*	0	0	0.00
Glass Cond	36,551	0		36,551	2.17	*	24,143	4.24	*	-185,619	-185,619	11.03
Wall Cond	113,330	16,902		130,232	7.74	*	172,726	30.35	*	-328,407	-377,319	22.42
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	650,287			650,287	38.66	*	126,598	22.24	*	-1,046,619	-1,046,619	62.19
Sub Total==>	955,246	38,386		993,632	59.07	*	463,073	81.37	*	-1,562,224	-1,683,004	100.00
Internal Loads												
Lights	277,628	0		277,628	16.51	*	75,396	13.25	*	0	0	0.00
People	45,248			45,248	2.69	*	5,354	0.94	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	322,876	0	0	322,876	19.20	*	80,750	14.19	*	0	0	0.00
Ceiling Load	14,654	-14,654		0	0.00	*	25,171	4.42	*	-47,811	0	0.00
Outside Air	0	0	0	252,299	15.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				110,564	6.57	*		0.00	*		0	0.00
Ret. Fan Heat		13,820		13,820	0.82	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	122			122	0.01	*	122	0.02	*	0	0	0.00
Exhaust Heat		-11,266	0	-11,266	-0.67	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	1,292,898	26,287	0	1,682,048	100.00	*	569,116	100.00	*	-1,610,035	-1,683,004	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	45.0	539.6	385.7	19,435 80.9 66.7 78.0	60.4 58.0 70.1	Part	41,364	
Aux Clg	92.8	1,113.0	720.5	34,668 75.0 63.8 73.2	65.7 53.1 41.6	ExFlr	0	
Opt Vent	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	Roof	14,680	0 0
Totals	137.7	1,652.6				Wall	28,354	5,152 18

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	30.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent	5,830	0	Clg Cfm/Sqft	0.47	SADB	65.7	92.4
Main Htg	-590.3	19,435	64.5	92.4	Infil	15,028	15,028	Clg Cfm/Ton	432.19	Plenum	76.1	64.4
Aux Htg	-1,092.7	34,668	68.0	97.0	Supply	19,435	19,435	Clg Sqft/Ton	919.84	Return	76.8	64.5
Preheat	-0.0	19,435	64.5	60.4	Mincfm	0	0	Clg Btuh/Sqft	13.05	Ret/OA	80.9	64.5
Reheat	0.0	0	0.0	0.0	Return	19,435	19,435	No. People	98	Runarnd	75.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	5,830	0	Htg % OA	0.0	Fn MtrTD	1.3	1.3
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	0.47	Fn BldTD	1.0	1.0
Total	-1,683.0				Auxil	34,668	34,668	Htg Btuh/Sqft	-14.27	Fn Frict	2.9	2.9

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 4 Block UH - UNIT HEATERS

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Percent		Space	Percent		Space Peak	Coil Peak	Percent
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Wall Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Partition	0			0	0.00	*	0	0.00	*	-6,715	-6,715	100.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-6,715	-6,715	100.00
Internal Loads												
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-6,715	-6,715	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	2,544		
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	1,632		
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	0.0	0.0				0	0	0

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F								
Main Htg	-6.7	1,835	68.0	71.4	Vent	0	0	Clg Cfm/Sqft	0.00	SADB	0.0	71.4
Aux Htg	0.0	0	0.0	0.0	Infil	0	0	Clg Cfm/Ton	0.00	Plenum	0.0	68.0
Preheat	0.0	0	0.0	0.0	Supply	0	1,835	Clg Sqft/Ton	0.00	Return	0.0	68.0
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	68.0
Humidif	0.0	0	0.0	0.0	Return	0	1,835	No. People	0	Runarnd	0.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-6.7				Rm Exh	0	0	Htg Cfm/Sqft	0.72	Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/Sqft	-2.64	Fn Frict	0.1	0.0

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 5 Block DD - DOUBLE DUCT

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct	Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot	Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)	(Btuh)	(Btuh)	(%)
Envelope Loads											
Skylite Solr	0	0		0	0.00		0	0.00	0	0	0.00
Skylite Cond	0	0		0	0.00		0	0.00	0	0	0.00
Roof Cond	14,486	0		14,486	1.94		16,221	5.86	-48,286	-48,286	24.48
Glass Solar	15,817	0		15,817	2.11		14,694	5.31	0	0	0.00
Glass Cond	3,286	0		3,286	0.44		3,509	1.27	-16,588	-16,588	8.41
Wall Cond	4,161	526		4,687	0.63		5,622	2.03	-16,677	-18,921	9.59
Partition	0			0	0.00		0	0.00	0	0	0.00
Exposed Floor	0			0	0.00		0	0.00	0	0	0.00
Infiltration	29,259			29,259	3.91		14,420	5.21	-59,539	-59,539	30.18
Sub Total==>	67,009	526		67,535	9.03		54,465	19.67	-141,090	-143,334	72.66
Internal Loads											
Lights	190,447	0		190,447	25.46		200,839	72.53	0	0	0.00
People	30,203			30,203	4.04		14,612	5.28	0	0	0.00
Misc	0	0	0	0	0.00		0	0.00	0	0	0.00
Sub Total==>	220,650	0	0	220,650	29.50		215,452	77.81	0	0	0.00
Ceiling Load	1,375	-1,375		0	0.00		1,553	0.56	-4,627	0	0.00
Outside Air	0	0	0	286,016	38.24		0	0.00	0	0	0.00
Sup. Fan Heat				158,470	21.19			0.00		0	0.00
Ret. Fan Heat		19,809		19,809	2.65			0.00		0	0.00
Duct Heat Pkup		0		0	0.00			0.00		0	0.00
OV/UNDR Sizing	5,428			5,428	0.73		5,428	1.96	-53,926	-53,926	27.34
Exhaust Heat		-9,934	0	-9,934	-1.33			0.00		0	0.00
Terminal Bypass		0	0	0	-0.00			0.00		0	0.00
Grand Total==>	294,461	9,026	0	747,973	100.00		276,897	100.00	-199,643	-197,260	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	62.3	748.0	571.6	27,856 80.4 68.3 87.2	60.6 60.3 79.7	27,121		
Aux Clg	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	0		
Opt Vent	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	62.3	748.0				8,563	0	0
						1,613	460	29

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	30.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F								
Main Htg	-422.8	27,856	60.6	74.6	Vent	8,357	0	Clg Cfm/Sqft	1.03	SADB	65.9	74.6
Aux Htg	0.0	0	0.0	0.0	Infil	855	855	Clg Cfm/Ton	446.90	Plenum	75.4	66.5
Preheat	-370.1	27,856	48.4	60.6	Supply	27,856	27,856	Clg Sqft/Ton	435.11	Return	76.1	67.5
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	27.58	Ret/OA	80.4	67.5
Humidif	0.0	0	0.0	0.0	Return	27,856	27,856	No. People	65	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	8,357	0	Htg % OA	0.0	Fn MtrTD	1.3	1.3
Total	-792.9				Rm Exh	0	0	Htg Cfm/Sqft	1.03	Fn BldTD	1.0	1.0
					Auxil	0	0	Htg Btuh/Sqft	-29.24	Fn Frict	2.9	2.9

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 6 Block DD - DOUBLE DUCT

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct	Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot	Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)	(Btuh)	(Btuh)	(%)
Envelope Loads											
Skylite Solr	0	0		0	0.00		0	0.00	0	0	0.00
Skylite Cond	0	0		0	0.00		0	0.00	0	0	0.00
Roof Cond	14,486	0		14,486	1.94		16,221	5.86	-48,286	-48,286	24.48
Glass Solar	15,817	0		15,817	2.11		14,694	5.31	0	0	0.00
Glass Cond	3,286	0		3,286	0.44		3,509	1.27	-16,588	-16,588	8.41
Wall Cond	4,161	526		4,687	0.63		5,622	2.03	-16,677	-18,921	9.59
Partition	0			0	0.00		0	0.00	0	0	0.00
Exposed Floor	0			0	0.00		0	0.00	0	0	0.00
Infiltration	29,259			29,259	3.91		14,420	5.21	-59,539	-59,539	30.18
Sub Total==>	67,009	526		67,535	9.03		54,465	19.67	-141,090	-143,334	72.66
Internal Loads											
Lights	190,447	0		190,447	25.46		200,839	72.53	0	0	0.00
People	30,203			30,203	4.04		14,612	5.28	0	0	0.00
Misc	0	0	0	0	0.00		0	0.00	0	0	0.00
Sub Total==>	220,650	0	0	220,650	29.50		215,452	77.81	0	0	0.00
Ceiling Load	1,375	-1,375		0	0.00		1,553	0.56	-4,627	0	0.00
Outside Air	0	0	0	286,016	38.24		0	0.00	0	0	0.00
Sup. Fan Heat				158,470	21.19			0.00		0	0.00
Ret. Fan Heat		19,809		19,809	2.65			0.00		0	0.00
Duct Heat Pkup		0		0	0.00			0.00		0	0.00
OV/UNDR Sizing	5,428			5,428	0.73		5,428	1.96	-53,926	-53,926	27.34
Exhaust Heat		-9,934	0	-9,934	-1.33			0.00		0	0.00
Terminal Bypass		0	0	0	-0.00			0.00		0	0.00
Grand Total==>	294,461	9,026	0	747,973	100.00		276,897	100.00	-199,643	-197,260	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	62.3	748.0	571.6	80.4 68.3 87.2	60.6 60.3 79.7	27,121		
Aux Clg	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	0		
Opt Vent	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	62.3	748.0				8,563	0	0
						1,613	460	29

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	30.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent	8,357	0	Clg Cfm/Sqft	1.03	SADB	65.9	74.6
Main Htg	-215.8	27,856	67.5	74.6	Infil	855	855	Clg Cfm/Ton	446.90	Plenum	75.4	66.5
Aux Htg	0.0	0	0.0	0.0	Supply	27,856	27,856	Clg Sqft/Ton	435.11	Return	76.1	67.5
Preheat	-370.1	27,856	48.4	60.6	Mincfm	0	0	Clg 8tuh/Sqft	27.58	Ret/OA	80.4	67.5
Reheat	0.0	0	0.0	0.0	Return	27,856	27,856	No. People	65	Runarnd	75.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	8,357	0	Htg % OA	0.0	Fn MtrTD	1.3	1.3
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	1.03	Fn BldTD	1.0	1.0
Total	-585.9				Auxil	0	0	Htg 8tuh/Sqft	-21.60	Fn Frict	2.9	2.9

BUILDING U-VALUES - ALTERNATIVE 2
DOUBLE GLAZED WINDOWS

----- B U I L D I N G U - V A L U E S -----

Room Number	Description	Part.	ExFlr	Room U-Values (8tu/hr/sqft/F)							Room Mass (lb/ sqft)	Room Capac. (8tu/ sqft/F)
				Summr Skylt	Wintr Skylt	Summr Roof	Wintr Windo	Windo	Wall	Ceil.		
1	SUB BSMT, BSMT W	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
Zone	1 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
4	BSMT E	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
Zone	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
System	1 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.4	9.54
2	TOILETS, KITCHEN	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	29.4	5.93
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	29.4	5.93
11	TOILETS W ROOF	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
Zone	11 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.317	35.3	7.23
3	STAIRS	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.229	0.000	103.3	21.63
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.229	0.000	103.3	21.63
5	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	57.9	12.05
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	57.9	12.05
7	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	56.7	11.81
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	56.7	11.81
9	3RD FL OFFICES	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.317	102.3	21.84
Zone	9 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.317	102.3	21.84
12	STAIRS W ROOF	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.229	0.000	146.4	31.13
Zone	12 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.229	0.000	146.4	31.13
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.256	0.317	74.1	15.63
13	SUPPLY STORAGE	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
Zone	13 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
System	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
6	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	32.5	6.60
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	32.5	6.60
8	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.000	27.0	5.41
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.000	27.0	5.41
10	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.000	71.5	15.21
Zone	10 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.000	71.5	15.21
System	5 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.317	43.1	8.94
14	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	32.5	6.60
Zone	14 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	32.5	6.60
15	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.000	27.0	5.41
Zone	15 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.000	27.0	5.41
16	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.000	71.5	15.21
Zone	16 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.000	71.5	15.21
System	6 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.317	43.1	8.94
Building		0.229	0.000	0.000	0.000	0.088	0.550	0.563	0.256	0.317	52.6	10.93

BUILDING AREAS - ALTERNATIVE 2
DOUBLE GLAZED WINDOWS

BUILDING AREAS

Room Number	Description	Number of Duplicate Flr Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	SUB BSMT, BSMT W	1	1	45,125	45,125	13,222	0	0	0	0	0	0
Zone	1 Total/Ave.			45,125	13,222	0	0	0	0	0	0	0
4	BSMT E	1	1	12,424	12,424	3,348	0	0	0	0	0	0
Zone	4 Total/Ave.			12,424	3,348	0	0	0	0	0	0	0
System	1 Total/Ave.			57,549	16,570	0	0	0	0	0	0	0
2	TOILETS, KITCHEN	1	1	3,520	3,520	0	0	0	0	21	11	174
Zone	2 Total/Ave.			3,520	0	0	0	0	0	21	11	174
11	TOILETS W ROOF	1	1	580	580	0	0	0	580	0	0	0
Zone	11 Total/Ave.			580	0	0	0	0	580	0	0	0
System	2 Total/Ave.			4,100	0	0	0	0	580	21	11	174
3	STAIRS	1	1	560	560	0	0	0	0	255	29	625
Zone	3 Total/Ave.			560	0	0	0	0	0	255	29	625
5	1ST FL OFFICES	1	1	11,724	11,724	0	0	0	0	1,573	19	6,530
Zone	5 Total/Ave.			11,724	0	0	0	0	0	1,573	19	6,530
7	2ND FL OFFICES	1	1	14,400	14,400	0	0	0	0	1,610	17	7,730
Zone	7 Total/Ave.			14,400	0	0	0	0	0	1,610	17	7,730
9	3RD FL OFFICES	1	1	14,400	14,400	0	0	0	14,400	1,610	17	8,010
Zone	9 Total/Ave.			14,400	0	0	0	0	14,400	1,610	17	8,010
12	STAIRS W ROOF	1	1	280	280	0	0	0	280	105	25	307
Zone	12 Total/Ave.			280	0	0	0	0	280	105	25	307
System	3 Total/Ave.			41,364	0	0	0	0	14,680	5,152	18	23,202
13	SUPPLY STORAGE	1	1	2,544	2,544	1,632	0	0	0	0	0	0
Zone	13 Total/Ave.			2,544	1,632	0	0	0	0	0	0	0
System	4 Total/Ave.			2,544	1,632	0	0	0	0	0	0	0
6	1ST FL CEN OFFCS	1	1	9,884	9,884	0	0	0	0	250	19	1,038
Zone	6 Total/Ave.			9,884	0	0	0	0	0	250	19	1,038
8	2ND FL CEN OFFCS	1	1	8,674	8,674	0	0	0	0	105	66	55
Zone	8 Total/Ave.			8,674	0	0	0	0	0	105	66	55
10	3RD FL CEN OFFCS	1	1	8,563	8,563	0	0	0	8,563	105	64	60
Zone	10 Total/Ave.			8,563	0	0	0	0	8,563	105	64	60
System	5 Total/Ave.			27,121	0	0	0	0	8,563	460	29	1,153
14	1ST FL CEN OFFCS	1	1	9,884	9,884	0	0	0	0	250	19	1,038
Zone	14 Total/Ave.			9,884	0	0	0	0	0	250	19	1,038
15	2ND FL CEN OFFCS	1	1	8,674	8,674	0	0	0	0	105	66	55
Zone	15 Total/Ave.			8,674	0	0	0	0	0	105	66	55
16	3RD FL CEN OFFCS	1	1	8,563	8,563	0	0	0	8,563	105	64	60
Zone	16 Total/Ave.			8,563	0	0	0	0	8,563	105	64	60
System	6 Total/Ave.			27,121	0	0	0	0	8,563	460	29	1,153
Building				159,799	18,202	0	0	0	32,386	6,095	19	25,681

ASHRAE 90 ANALYSIS - ALTERNATIVE 2
DOUBLE GLAZED WINDOWS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.088 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.313 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.199 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.96 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTVw) = 21.90 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2
BOUBLE GLAZED WINDOWS

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	17.4	0	0	-186,616	16	190	6,541.3	0	0	0.0	0	0
5 - 10	34.7	0	0	-373,231	4	44	13,082.7	0	0	0.0	0	0
10 - 15	52.1	7	80	-559,847	10	121	19,624.1	0	0	0.0	0	0
15 - 20	69.4	9	96	-746,463	3	40	26,165.4	0	0	0.0	0	0
20 - 25	86.8	6	64	-933,078	5	65	32,706.7	0	0	0.0	0	0
25 - 30	104.1	3	36	-1,119,694	7	83	39,248.1	0	0	0.0	0	0
30 - 35	121.5	17	186	-1,306,310	7	82	45,789.5	0	0	0.0	0	0
35 - 40	138.8	14	155	-1,492,926	30	366	52,330.8	0	0	0.0	0	0
40 - 45	156.2	9	91	-1,679,541	16	191	58,872.2	0	0	0.0	0	0
45 - 50	173.5	5	53	-1,866,157	3	41	65,413.5	0	0	0.0	0	0
50 - 55	190.9	6	64	-2,052,773	0	0	71,954.9	0	0	0.0	0	0
55 - 60	208.2	2	22	-2,239,388	0	0	78,496.2	0	0	0.0	0	0
60 - 65	225.6	2	23	-2,426,004	0	0	85,037.6	0	0	0.0	0	0
65 - 70	242.9	7	75	-2,612,620	0	0	91,578.9	0	0	0.0	0	0
70 - 75	260.3	7	80	-2,799,236	0	0	98,120.3	0	0	0.0	0	0
75 - 80	277.7	3	35	-2,985,851	0	0	104,661.6	0	0	0.0	0	0
80 - 85	295.0	1	10	-3,172,467	0	0	111,203.0	0	0	0.0	0	0
85 - 90	312.4	0	0	-3,359,083	0	0	117,744.3	100	2,520	0.0	0	0
90 - 95	329.7	0	0	-3,545,699	0	0	124,285.7	0	0	0.0	0	0
95 - 100	347.1	0	0	-3,732,314	0	0	130,827.0	0	0	0.0	0	0
Hours Off	0.0	0	7,690	0	0	7,537	0.0	0	6,240	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2
BOUBLE GLAZED WINDOWS

----- B U I L D I N G T E M P E R A T U R E P R O F I L E S -----																
Temperature Range (F)	----- Zone Number -----															
	1	4	2	11	3	5	7	9	12	13	6	8	10	14	15	16
Max. Temp.	82.6	81.5	209.9	120.2	86.6	85.0	84.8	83.4	85.6	96.2	85.3	89.0	84.5	85.3	89.0	84.5
Mo./Hr.	10 21	10 23	9 19	8 16	7 20	7 24	7 24	7 21	7 22	8 17	7 3 10	4 7 6	7 3 10	4 7 6	4 7 6	4 7 6
Day Type	2	2	2	2	4	1	1	4	4	2	5	2	5	5	2	5
..... Number of Hours																
Above 100	0	0	8,016	4,086	0	0	0	0	0	0	0	0	0	0	0	0
95 - 100	0	0	0	110	0	0	0	0	0	240	0	0	0	0	0	0
90 - 95	0	0	162	1,239	0	0	0	0	0	1,494	0	0	0	0	0	0
85 - 90	0	0	265	253	140	0	0	0	52	1,602	30	744	0	30	664	0
80 - 85	954	517	215	585	1,221	1,271	1,220	804	1,200	1,215	2,044	3,664	1,616	2,044	3,611	1,616
75 - 80	5,027	2,814	102	327	1,883	1,994	2,016	2,407	1,999	818	3,012	4,056	3,808	3,032	4,053	3,803
70 - 75	1,202	3,711	0	1,256	462	627	656	801	472	1,435	1,541	296	1,324	1,406	420	1,289
65 - 70	1,418	1,516	0	726	1,570	1,513	1,493	1,612	1,514	1,579	1,141	0	1,438	1,186	12	1,386
60 - 65	159	202	0	178	1,132	1,147	1,205	1,409	1,295	377	421	0	453	466	0	509
55 - 60	0	0	0	0	838	872	855	746	957	0	330	0	121	340	0	157
50 - 55	0	0	0	0	659	543	519	428	548	0	241	0	0	256	0	0
Below 50	0	0	0	0	855	793	796	553	723	0	0	0	0	0	0	0
Min. Temp.	63.8	63.0	68.1	63.6	35.3	35.8	35.9	38.8	36.9	61.7	51.9	68.0	58.3	51.6	68.0	58.0
Mo./Hr.	1 8	1 10	1 1	2 6	2 7	2 7	2 7	2 7	2 7	1 6	2 7	1 1	1 7	2 7	1 1	1 7
Day Type	5	5	1	5	5	5	5	5	5	5	5	1	5	5	1	5

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2
DOUBLE GLAZED WINDOWS

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	STEAM	STEAM DMND	
	Off Peak (kWh)	On Peak (kW)	On Peak (Therm)	WATER (1000 G1)	On Peak (Thrm/hr)
Jan	163,358	813	10,933	0	65
Feb	147,800	813	10,358	0	65
March	178,338	813	7,721	0	58
April	142,713	813	1,579	0	41
May	191,368	947	0	73	0
June	198,133	1,011	0	118	0
July	196,371	1,060	0	192	0
Aug	208,413	1,018	0	130	0
Sept	174,456	974	0	69	0
Oct	160,617	813	810	0	40
Nov	151,428	813	3,728	0	52
Dec	155,579	813	9,096	0	63
Total	2,074,575	1,060	44,225	582	65

Building Energy Consumption = 71,984 (Btu/Sq Ft/Year)
Source Energy Consumption = 169,840 (Btu/Sq Ft/Year)

Floor Area = 159,799 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION

Ref Num	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	78913	71397	86428	75155	82671	82671	75155	86428	75155	82671	75155	75155	946,954
	PK	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7
1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH2O	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1001S		2-STG CTV <555 TONS											
	ELEC	0	0	0	0	13952	20718	35085	22933	13170	0	0	0	105,857
	PK	0.0	0.0	0.0	0.0	106.1	169.5	218.7	176.8	132.9	0.0	0.0	0.0	218.7
1	EQ5100		COOLING TOWER											
	ELEC	0	0	0	0	5115	5115	4650	5348	4650	0	0	0	24,878
	PK	0.0	0.0	0.0	0.0	23.3	23.3	23.3	23.3	23.3	0.0	0.0	0.0	23.3
1	EQ5100		COOLING TOWER											
	WATER	0	0	0	0	73	118	192	130	69	0	0	0	582
	PK	0.0	0.0	0.0	0.0	0.6	0.9	1.1	1.0	0.8	0.0	0.0	0.0	1.1
1	EQ5001		CHILLED WATER PUMP C.V.											
	ELEC	0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
	PK	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5010		CONDENSER WATER PUMP C.V.											
	ELEC	0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
	PK	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5300		CONTROL PANEL & INTERLOCK											

[illegible]

ELEC	6264	5667	6294	2267	0	0	0	0	0	895	3460	5966	30,812
PK	29.8	29.8	29.8	29.8	0.0	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8

[illegible]

UTILITY PEAK CHECKSUMS - ALTERNATIVE 2
DOUBLE GLAZED WINDOWS

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 1,060.0 (kW)
Yearly Time of Peak 14 (hr) 7 (mo)

Hour 14 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Perct Of Tot (%)
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Cooling Equipment

1	EQ1001S	2-STG CTV <555 TONS	302.6	28.55
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Sub Total			302.6	28.55
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Sub Total			0.0	0.00
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Air Moving Equipment

1		SUMMATION OF FAN ELECTRICAL DEMAND	57.3	5.40
3		SUMMATION OF FAN ELECTRICAL DEMAND	74.9	7.06
5		SUMMATION OF FAN ELECTRICAL DEMAND	107.3	10.12
6		SUMMATION OF FAN ELECTRICAL DEMAND	107.3	10.12

Sub Total			346.8	32.71
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Sub Total			0.0	0.00
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Miscellaneous

Lights			410.7	38.74
Base Utilities			0.0	0.00
Misc Equipment			0.0	0.00
Sub Total			410.7	38.74

Grand Total			1,060.0	100.00
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 122

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Relectance: 0.20
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 9: 7: 3 2/ 2/94
Dataset Name: CB122 .TM

AIRFLOW - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- S Y S T E M S U M M A R Y -----
(Design Airflow Quantities)

System Number	System Type	Main					Auxil.	Room
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	TRH	10,853	36,175	36,175	36,175	10,853	0	0
2	SZ	0	17,730	17,730	17,730	0	0	17,730
3	INDFP	5,830	19,435	19,435	34,746	19,435	35,846	0
4	UH	0	0	1,835	0	0	0	0
5	DD	8,363	27,876	27,876	28,747	27,876	0	0
6	DD	8,357	27,856	27,856	28,727	9,228	0	0
Totals		33,403	129,072	130,907	146,125	67,391	35,846	17,730

CAPACITY - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- S Y S T E M S U M M A R Y -----
(Design Capacity Quantities)

System Number	System Type	Cooling					Heating					
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	TRH	81.5	0.0	0.0	81.5	-68,182	0	-480,162	0	0	0	-548,345
2	SZ	3.2	0.0	0.0	3.2	-9,837	0	-106,277	0	0	0	-9,837
3	INDFP	46.4	95.1	0.0	141.5	-680,963	-1,112,457	0	0	0	0	-1,793,420
4	UH	0.0	0.0	0.0	0.0	-6,715	0	0	0	0	0	-6,715
5	DD	62.8	0.0	0.0	62.8	-441,147	0	-367,097	0	0	0	-808,244
6	DD	62.8	0.0	0.0	62.8	-230,501	0	-366,647	0	0	0	-597,149
Totals		256.8	95.1	0.0	351.9	-1,437,345	-1,112,457	-1,320,184	0	0	0	-3,763,708

The building peaked at hour 14 month 7 with a capacity of 256.7 tons

ENGINEERING CHECKS - ALTERNATIVE 3
 WEATHERSTRIP & CAULKING

----- E N G I N E E R I N G C H E C K S -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	----- Cooling -----				--- Heating ---		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	TRH	30.00	0.63	443.7	705.9	17.00	0.63	-9.53	57,549
2	Main	SZ	0.00	4.32	5,605.2	1,296.2	9.26	4.32	-2.40	4,100
3	Main	INDFP	30.00	0.47	418.7	891.2	13.46	0.47	-16.46	41,364
3	Auxiliary	INDFP	0.00	0.87	376.9	434.9	27.59	0.87	-26.89	41,364
4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.72	-2.64	2,544
5	Main	DD	30.00	1.03	443.7	431.6	27.80	1.03	-29.80	27,121
6	Main	DD	30.00	1.03	443.5	431.8	27.79	1.03	-22.02	27,121

System 1 Peak TRH - TERMINAL REHEAT

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Wall Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Partition	18,940			-18,940	1.94	*	18,940	4.00	*	-68,182	-68,182	100.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	18,940	0		18,940	1.94	*	18,940	4.00	*	-68,182	-68,182	100.00
Internal Loads												
Lights	398,781	0		398,781	40.76	*	424,020	89.45	*	0	0	0.00
People	63,941			63,941	6.54	*	31,097	6.56	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	462,722	0	0	462,722	47.30	*	455,117	96.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	406,913	41.59	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				77,173	7.89	*		0.00	*		0	0.00
Ret. Fan Heat		18,007		18,007	1.84	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	-0.00	*	0	-0.00	*	0	0	0.00
Exhaust Heat		-5,402	0	-5,402	-0.55	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	481,661	12,605	0	978,353	100.00	*	474,057	100.00	*	-68,182	-68,182	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	81.5	978.4	719.6	36,175 80.0 67.5 83.9	61.0 59.3 74.8	57,549		
Aux Clg	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	16,570		
Opt Vent	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	81.5	978.4				0	0	0

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	30.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F								
Main Htg	-68.2	36,175	68.0	69.7	Vent	10,853	0	Clg Cfm/Sqft	0.63	SADB	63.0	69.7
Aux Htg	0.0	0	0.0	0.0	Infil	0	0	Clg Cfm/Ton	443.70	Plenum	75.0	68.0
Preheat	-480.2	36,175	48.8	61.0	Supply	36,175	36,175	Clg Sqft/Ton	705.87	Return	75.5	68.0
Reheat	-0.0	0	0.0	0.0	Mincfm	36,175	0	Clg Btuh/Sqft	17.00	Ret/OA	80.0	68.0
Humidif	0.0	0	0.0	0.0	Return	36,175	36,175	No. People	137	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	10,853	0	Htg % OA	0.0	Fn MtrTD	0.5	0.5
Total	-548.3				Rm Exh	0	0	Htg Cfm/Sqft	0.63	Fn BldTD	0.4	0.4
					Auxil	0	0	Htg Btuh/Sqft	-9.53	Fn Frict	1.1	1.1

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 2 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/16 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	860		860	2.26	*	0	0.00	*	0	-3,224	44.57
Glass Solar	595	0		595	1.57	*	595	1.71	*	0	0	0.00
Glass Cond	239	0		239	0.63	*	239	0.69	*	-1,139	-1,139	15.75
Wall Cond	747	183		929	2.45	*	747	2.14	*	-2,286	-2,870	39.68
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	1,581	1,042		2,623	6.91	*	1,581	4.54	*	-3,426	-7,234	100.00
Internal Loads												
Lights	30,623	0		30,623	80.68	*	30,623	87.96	*	0	0	0.00
People	4,712			4,712	12.41	*	2,223	6.38	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	35,335	0	0	35,335	93.09	*	32,845	94.34	*	0	0	0.00
Ceiling Load	1,918	-1,918		0	0.00	*	389	1.12	*	-243	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	-0.00	*	0	-0.00	*	0	0	-0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	38,834	-876	0	37,958	100.00	*	34,815	100.00	*	-3,668	-7,234	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor		
Main Clg	3.2	38.0	35.5	17,730	76.6	68.9	96.8	73.2	68.3	99.1	Part	0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	580
Totals	3.2	38.0									Wall	196

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	--ENGINEERING CHECKS--		--TEMPERATURES (F)--		
	(Mbh)	(cfm)	Deg F	Deg F	Vent	0	0	Clg % OA	0.0	Type	Clg	Htg
Main Htg	-9.8	17,730	67.7	68.2	Infil	0	0	Clg Cfm/Sqft	4.32	SADB	73.2	68.2
Aux Htg	0.0	0	0.0	0.0	Supply	17,730	17,730	Clg Cfm/Ton	5605.16	Plenum	76.5	67.7
Preheat	-106.3	17,730	67.7	73.2	Mincfm	0	0	Clg Sqft/Ton	1296.17	Return	79.7	67.7
Reheat	0.0	0	0.0	0.0	Return	0	17,730	Clg Btuh/Sqft	9.26	Ret/OA	76.6	67.7
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	No. People	10	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	17,730	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-9.8				Auxil	0	0	Htg Cfm/Sqft	4.32	Fn BldTD	0.0	0.0
								Htg Btuh/Sqft	-2.40	Fn Frict	0.0	0.0

System 3 Block INDFP - 4-PIPE INDUCTION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/19 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 85 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	474	21,484		21,957	1.27	*	664	0.10	*	-1,579	-73,446	4.10
Glass Solar	171,927	0		171,927	9.94	*	185,822	28.22	*	0	0	0.00
Glass Cond	53,830	0		53,830	3.11	*	40,082	6.09	*	-276,287	-276,287	15.41
Wall Cond	113,330	16,902		130,232	7.53	*	168,977	25.66	*	-328,407	-377,319	21.04
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	662,719			662,719	38.33	*	153,520	23.31	*	-1,066,367	-1,066,367	59.46
Sub Total==>	1,002,279	38,386		1,040,665	60.18	*	549,065	83.38	*	-1,672,640	-1,793,420	100.00
Internal Loads												
Lights	277,628	0		277,628	16.06	*	79,744	12.11	*	0	0	0.00
People	45,248			45,248	2.62	*	6,070	0.92	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	322,876	0	0	322,876	18.67	*	85,814	13.03	*	0	0	0.00
Ceiling Load	14,654	-14,654		0	0.00	*	23,486	3.57	*	-47,811	0	0.00
Outside Air	0	0	0	252,361	14.59	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				110,564	6.39	*		0.00	*		0	0.00
Ret. Fan Heat		13,820		13,820	0.80	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	119			119	0.01	*	119	0.02	*	0	0	0.00
Exhaust Heat		-11,266	0	-11,266	-0.65	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	1,339,929	26,287	0	1,729,140	100.00	*	658,484	100.00	*	-1,720,451	-1,793,420	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	46.4	557.0	402.9	80.9 66.7 78.0	59.9 57.7 69.7	41,364		
Aux Clg	95.1	1,141.4	742.6	75.0 63.8 73.0	65.1 53.1 42.6	0		
Opt Vent	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	141.5	1,698.3				Roof	14,680	0 0
						Wall	28,354	5,152 18

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	30.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent	5,830	0	Clg Cfm/Sqft	0.47	SADB	65.1	96.7
Main Htg	-681.0	19,435	64.5	96.7	Infil	15,311	15,311	Clg Cfm/Ton	418.73	Plenum	76.1	64.4
Aux Htg	-1,112.5	35,846	68.0	96.6	Supply	19,435	19,435	Clg Sqft/Ton	891.20	Return	76.8	64.5
Preheat	-0.0	19,435	64.5	59.9	Mincfm	0	0	Clg Btuh/Sqft	13.46	Ret/OA	80.9	64.5
Reheat	0.0	0	0.0	0.0	Return	19,435	19,435	No. People	98	Runarnd	75.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	5,830	0	Htg % OA	0.0	Fn MtrTD	1.3	1.3
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	0.47	Fn BldTD	1.0	1.0
Total	-1,793.4				Auxil	35,846	35,846	Htg Btuh/Sqft	-16.46	Fn Frict	2.9	2.9

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 4 Block UH - UNIT HEATERS

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Wall Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Partition	0			0	0.00	*	0	0.00	*	-6,715	-6,715	100.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-6,715	-6,715	100.00
Internal Loads												
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-6,715	-6,715	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Part	2,544	
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	1,632	
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Roof	0	0 0
Totals	0.0	0.0				Wall	0	0 0

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent			Clg Cfm/Sqft	0.00	SADB	0.0	71.4
Main Htg	-6.7	1,835	68.0	71.4	Infil	0	0	Clg Cfm/Ton	0.00	Plenum	0.0	68.0
Aux Htg	0.0	0	0.0	0.0	Supply	0	1,835	Clg Sqft/Ton	0.00	Return	0.0	68.0
Preheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	68.0
Reheat	0.0	0	0.0	0.0	Return	0	1,835	No. People	0	Runarnd	0.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	0.72	Fn BldTD	0.0	0.0
Total	-6.7				Auxil	0	0	Htg Btuh/Sqft	-2.64	Fn Frict	0.1	0.0

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 5 Block DD - DOUBLE DUCT

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	14,486	0		14,486	1.92	*	16,221	5.79	*	-48,286	-48,286	22.76
Glass Solar	17,909	0		17,909	2.38	*	16,285	5.81	*	0	0	0.00
Glass Cond	4,840	0		4,840	0.64	*	5,167	1.84	*	-24,690	-24,690	11.64
Wall Cond	4,161	526		4,687	0.62	*	5,622	2.01	*	-16,677	-18,921	8.92
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	29,955			29,955	3.97	*	14,692	5.24	*	-60,663	-60,663	28.59
Sub Total==>	71,351	526		71,877	9.53	*	57,987	20.68	*	-150,315	-152,560	71.91
Internal Loads												
Lights	190,447	0		190,447	25.26	*	200,839	71.63	*	0	0	0.00
People	30,203			30,203	4.01	*	14,612	5.21	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	220,650	0	0	220,650	29.26	*	215,452	76.84	*	0	0	0.00
Ceiling Load	1,374	-1,374		0	0.00	*	1,552	0.55	*	-4,624	0	0.00
Outside Air	0	0	0	287,603	38.14	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				158,583	21.03	*		0.00	*		0	0.00
Ret. Fan Heat		19,823		19,823	2.63	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	5,387			5,387	0.71	*	5,387	1.92	*	-59,592	-59,592	28.09
Exhaust Heat		-9,939	0	-9,939	-1.32	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	-0.00	*		0.00	*		0	0.00
Grand Total==>	298,761	9,036	0	753,984	100.00	*	280,377	100.00	*	-214,532	-212,152	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor		
Main Clg	62.8	754.0	575.7	27,876	80.4	68.3	87.1	60.5	60.2	79.4	27,121	
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0	
Totals	62.8	754.0										

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	--ENGINEERING CHECKS--			--TEMPERATURES (F)---		
	(Mbh)	(cfm)	Deg F	Deg F				Clg % OA	30.0	Type	Clg	Htg	
Main Htg	-441.1	27,876	60.5	75.1	Vent	8,363	0	Clg Cfm/Sqft	1.03	SADB	65.8	75.1	
Aux Htg	0.0	0	0.0	0.0	Infil	871	871	Clg Cfm/Ton	443.66	Plenum	75.4	66.5	
Preheat	-367.1	27,876	48.4	60.5	Supply	27,876	27,876	Clg Sqft/Ton	431.64	Return	76.1	67.5	
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	27.80	Ret/OA	80.4	67.5	
Humidif	0.0	0	0.0	0.0	Return	27,876	27,876	No. People	65	Runarnd	75.0	68.0	
Opt Vent	0.0	0	0.0	0.0	Exhaust	8,363	0	Htg % OA	0.0	Fn MtrTD	1.3	1.3	
Total	-808.2				Rm Exh	0	0	Htg Cfm/Sqft	1.03	Fn BldTD	1.0	1.0	
					Auxil	0	0	Htg Btuh/Sqft	-29.80	Fn Frict	2.9	2.9	

System 6 Block DD - DOUBLE DUCT

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Percent		Space	Percent		Space Peak	Coil Peak	Percent
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	14,486	0		14,486	1.92	*	16,221	5.79	*	-48,286	-48,286	22.78
Glass Solar	17,909	0		17,909	2.38	*	16,285	5.81	*	0	0	0.00
Glass Cond	4,840	0		4,840	0.64	*	5,167	1.84	*	-24,690	-24,690	11.65
Wall Cond	4,161	526		4,687	0.62	*	5,622	2.01	*	-16,677	-18,921	8.93
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	29,963			29,963	3.98	*	14,692	5.24	*	-60,663	-60,663	28.62
Sub Total==>	71,359	526		71,885	9.54	*	57,987	20.68	*	-150,315	-152,560	71.96
Internal Loads												
Lights	190,447	0		190,447	25.27	*	200,839	71.63	*	0	0	0.00
People	30,203			30,203	4.01	*	14,612	5.21	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	220,650	0	0	220,650	29.27	*	215,452	76.84	*	0	0	0.00
Ceiling Load	1,375	-1,375		0	0.00	*	1,553	0.55	*	-4,627	0	0.00
Outside Air	0	0	0	287,477	38.14	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				158,470	21.02	*		0.00	*		0	0.00
Ret. Fan Heat		19,809		19,809	2.63	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	5,386			5,386	0.71	*	5,386	1.92	*	-59,435	-59,435	28.04
Exhaust Heat		-9,934	0	-9,934	-1.32	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	-0.00	*		0.00	*		0	0.00
Grand Total==>	298,770	9,026	0	753,742	100.00	*	280,377	100.00	*	-214,378	-211,995	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	62.8	753.7	575.5	27,856	80.4 68.3 87.1	60.5 60.2 79.4	27,121	
Aux Clg	0.0	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0	
Opt Vent	0.0	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0	
Totals	62.8	753.7					8,563	0 0
							1,613	460 29

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	30.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent	8,357	0	Clg Cfm/Sqft	1.03	SADB	65.8	75.1
Main Htg	-230.5	27,856	67.5	75.1	Infil	871	871	Clg Cfm/Ton	443.48	Plenum	75.4	66.5
Aux Htg	0.0	0	0.0	0.0	Supply	27,856	27,856	Clg Sqft/Ton	431.78	Return	76.1	67.5
Preheat	-366.6	27,856	48.4	60.5	Mincfm	0	0	Clg Btuh/Sqft	27.79	Ret/OA	80.4	67.5
Reheat	0.0	0	0.0	0.0	Return	27,856	27,856	No. People	65	Runarnd	75.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	8,357	0	Htg % OA	0.0	Fn MtrTD	1.3	1.3
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	1.03	Fn BldTD	1.0	1.0
Total	-597.1				Auxil	0	0	Htg Btuh/Sqft	-22.02	Fn Frict	2.9	2.9

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

BUILDING U-VALUES - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- B U I L D I N G U - V A L U E S -----												
		----- Room U-Values -----									Room	Room
		(Btu/hr/sqft/F)									Mass	Capac.
Room				Summr	Wintr		Summr	Wintr			(lb/	(Btu/
Number	Description	Part.	ExFlr	Skylt	Skylt	Roof	Windo	Windo	Wall	Ceil.	sqft)	sqft/F)
1	SUB BSMT, BSMT W	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
Zone	1 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
4	BSMT E	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
Zone	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
System	1 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.4	9.54
2	TOILETS, KITCHEN	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	29.4	5.93
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	29.4	5.93
11	TOILETS W ROOF	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
Zone	11 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	35.3	7.23
3	STAIRS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.229	0.000	103.3	21.63
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.229	0.000	103.3	21.63
5	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	57.9	12.05
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	57.9	12.05
7	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	56.7	11.81
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	56.7	11.81
9	3RD FL OFFICES	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	102.3	21.84
Zone	9 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	102.3	21.84
12	STAIRS W ROOF	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.229	0.000	146.4	31.13
Zone	12 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.229	0.000	146.4	31.13
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.256	0.317	74.1	15.63
13	SUPPLY STORAGE	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
Zone	13 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
System	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
6	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
8	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
10	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
Zone	10 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
System	5 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	43.1	8.94
14	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
Zone	14 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
15	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
Zone	15 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
16	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
Zone	16 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
System	6 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	43.1	8.94
Building		0.229	0.000	0.000	0.000	0.088	0.810	0.837	0.256	0.317	52.6	10.93

BUILDING AREAS - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- B U I L D I N G A R E A S -----

Room Number Description	Number of Duplicate Flr Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1 SUB BSMT, BSMT W	1 1	45,125	45,125	13,222	0	0	0	0	0	0	0
Zone 1 Total/Ave.			45,125	13,222	0	0	0	0	0	0	0
4 BSMT E	1 1	12,424	12,424	3,348	0	0	0	0	0	0	0
Zone 4 Total/Ave.			12,424	3,348	0	0	0	0	0	0	0
System 1 Total/Ave.			57,549	16,570	0	0	0	0	0	0	0
2 TOILETS, KITCHEN	1 1	3,520	3,520	0	0	0	0	0	21	11	174
Zone 2 Total/Ave.			3,520	0	0	0	0	0	21	11	174
11 TOILETS W ROOF	1 1	580	580	0	0	0	0	580	0	0	0
Zone 11 Total/Ave.			580	0	0	0	0	580	0	0	0
System 2 Total/Ave.			4,100	0	0	0	0	580	21	11	174
3 STAIRS	1 1	560	560	0	0	0	0	0	255	29	625
Zone 3 Total/Ave.			560	0	0	0	0	0	255	29	625
5 1ST FL OFFICES	1 1	11,724	11,724	0	0	0	0	0	1,573	19	6,530
Zone 5 Total/Ave.			11,724	0	0	0	0	0	1,573	19	6,530
7 2ND FL OFFICES	1 1	14,400	14,400	0	0	0	0	0	1,610	17	7,730
Zone 7 Total/Ave.			14,400	0	0	0	0	0	1,610	17	7,730
9 3RD FL OFFICES	1 1	14,400	14,400	0	0	0	0	14,400	1,610	17	8,010
Zone 9 Total/Ave.			14,400	0	0	0	0	14,400	1,610	17	8,010
12 STAIRS W ROOF	1 1	280	280	0	0	0	0	280	105	25	307
Zone 12 Total/Ave.			280	0	0	0	0	280	105	25	307
System 3 Total/Ave.			41,364	0	0	0	0	14,680	5,152	18	23,202
13 SUPPLY STORAGE	1 1	2,544	2,544	1,632	0	0	0	0	0	0	0
Zone 13 Total/Ave.			2,544	1,632	0	0	0	0	0	0	0
System 4 Total/Ave.			2,544	1,632	0	0	0	0	0	0	0
6 1ST FL CEN OFFCS	1 1	9,884	9,884	0	0	0	0	0	250	19	1,038
Zone 6 Total/Ave.			9,884	0	0	0	0	0	250	19	1,038
8 2ND FL CEN OFFCS	1 1	8,674	8,674	0	0	0	0	0	105	66	55
Zone 8 Total/Ave.			8,674	0	0	0	0	0	105	66	55
10 3RD FL CEN OFFCS	1 1	8,563	8,563	0	0	0	0	8,563	105	64	60
Zone 10 Total/Ave.			8,563	0	0	0	0	8,563	105	64	60
System 5 Total/Ave.			27,121	0	0	0	0	8,563	460	29	1,153
14 1ST FL CEN OFFCS	1 1	9,884	9,884	0	0	0	0	0	250	19	1,038
Zone 14 Total/Ave.			9,884	0	0	0	0	0	250	19	1,038
15 2ND FL CEN OFFCS	1 1	8,674	8,674	0	0	0	0	0	105	66	55
Zone 15 Total/Ave.			8,674	0	0	0	0	0	105	66	55
16 3RD FL CEN OFFCS	1 1	8,563	8,563	0	0	0	0	8,563	105	64	60
Zone 16 Total/Ave.			8,563	0	0	0	0	8,563	105	64	60
System 6 Total/Ave.			27,121	0	0	0	0	8,563	460	29	1,153
Building			159,799	18,202	0	0	0	32,386	6,095	19	25,681

ASHRAE 90 ANALYSIS - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.088 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.362 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.224 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.96 (Btu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTVw) = 24.46 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	17.6	0	0	-193,499	18	233	6,545.3	0	0	0.0	0	0
5 - 10	35.2	0	4	-386,999	3	40	13,090.7	0	0	0.0	0	0
10 - 15	52.8	7	76	-580,498	7	92	19,636.1	0	0	0.0	0	0
15 - 20	70.4	9	96	-773,997	3	37	26,181.4	0	0	0.0	0	0
20 - 25	88.0	8	84	-967,496	5	59	32,726.8	0	0	0.0	0	0
25 - 30	105.6	5	52	-1,160,996	8	106	39,272.1	0	0	0.0	0	0
30 - 35	123.2	16	173	-1,354,495	8	99	45,817.5	0	0	0.0	0	0
35 - 40	140.7	12	132	-1,547,995	29	364	52,362.8	0	0	0.0	0	0
40 - 45	158.3	9	91	-1,741,494	15	195	58,908.2	0	0	0.0	0	0
45 - 50	175.9	7	72	-1,934,993	3	37	65,453.5	0	0	0.0	0	0
50 - 55	193.5	4	45	-2,128,492	0	0	71,998.9	0	0	0.0	0	0
55 - 60	211.1	2	22	-2,321,992	0	0	78,544.2	0	0	0.0	0	0
60 - 65	228.7	4	38	-2,515,491	0	0	85,089.6	0	0	0.0	0	0
65 - 70	246.3	7	75	-2,708,990	0	0	91,634.9	0	0	0.0	0	0
70 - 75	263.9	6	65	-2,902,490	0	0	98,180.3	0	0	0.0	0	0
75 - 80	281.5	3	35	-3,095,989	0	0	104,725.6	0	0	0.0	0	0
80 - 85	299.1	1	10	-3,289,488	0	0	111,271.0	0	0	0.0	0	0
85 - 90	316.7	0	0	-3,482,988	0	0	117,816.3	100	2,520	0.0	0	0
90 - 95	334.3	0	0	-3,676,487	0	0	124,361.7	0	0	0.0	0	0
95 - 100	351.9	0	0	-3,869,986	0	0	130,907.0	0	0	0.0	0	0
Hours Off	0.0	0	7,690	0	0	7,498	0.0	0	6,240	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- B U I L D I N G T E M P E R A T U R E P R O F I L E S -----																
Temperature Range (F)	----- Zone Number -----															
	1	4	2	11	3	5	7	9	12	13	6	8	10	14	15	16
Max. Temp.	82.6	81.5	201.1	120.2	86.6	85.2	84.9	83.5	85.6	96.2	85.2	88.7	84.5	85.2	88.7	84.5
Mo./Hr.	10 21	10 23	9 19	8 16	7 20	7 24	7 24	7 22	7 20	8 17	7 2 10	3 7	5 7	2 10	3 7	5
Day Type	2	2	2	2	4	1	1	4	4	2	5	2	5	5	2	5
..... Number of Hours																
Above 100	0	0	8,016	4,086	0	0	0	0	0	0	0	0	0	0	0	0
95 - 100	0	0	0	110	0	0	0	0	0	240	0	0	0	0	0	0
90 - 95	0	0	91	1,239	0	0	0	0	0	1,494	0	0	0	0	0	0
85 - 90	0	0	290	253	135	12	0	0	52	1,602	25	552	0	25	552	0
80 - 85	954	517	227	585	1,193	1,272	1,200	826	1,192	1,215	1,955	3,532	1,608	1,955	3,437	1,608
75 - 80	5,027	2,814	136	327	1,803	1,962	2,027	2,366	1,961	818	3,009	4,226	3,751	3,033	4,159	3,746
70 - 75	1,202	3,711	0	1,256	558	579	598	701	501	1,435	1,462	450	1,334	1,306	586	1,323
65 - 70	1,418	1,516	0	726	1,454	1,481	1,524	1,587	1,425	1,579	1,203	0	1,471	1,265	26	1,397
60 - 65	159	202	0	178	1,054	1,107	1,104	1,345	1,172	377	504	0	444	553	0	504
55 - 60	0	0	0	0	957	879	895	875	994	0	299	0	152	312	0	182
50 - 55	0	0	0	0	649	624	585	454	664	0	303	0	0	311	0	0
Below 50	0	0	0	0	957	844	827	606	799	0	0	0	0	0	0	0
Min. Temp.	63.8	63.0	68.0	63.6	34.6	35.2	35.2	38.0	36.1	61.7	51.1	68.0	57.8	50.9	68.0	57.6
Mo./Hr.	1 8	1 10	1 1	2 6	2 11	2 7	2 7	2 7	2 7	1 6	2 7	1 1	1 7	2 7	1 1	1 7
Day Type	5	5	1	5	4	5	5	5	5	5	5	1	5	5	1	5

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	STEAM On Peak (Therm)	WATER (1000 G1)	STEAM DMND On Peak (Thrm/hr)
Jan	163,374	813	11,257	0	67
Feb	147,815	813	10,595	0	67
March	177,304	813	8,100	0	60
April	148,829	813	1,856	0	42
May	191,290	948	0	73	0
June	198,163	1,013	0	118	0
July	196,626	1,067	0	193	0
Aug	208,452	1,022	0	130	0
Sept	174,396	975	0	68	0
Oct	162,125	813	1,028	0	41
Nov	152,329	813	4,082	0	53
Dec	155,594	813	9,549	0	65
Total	2,076,296	1,067	46,466	582	67

Building Energy Consumption = 73,424 (Btu/Sq Ft/Year)
Source Energy Consumption = 171,821 (Btu/Sq Ft/Year)

Floor Area = 159,799 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION

Ref Num	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS ELEC PK	78913 410.7	71397 410.7	86428 410.7	75155 410.7	82671 410.7	82671 410.7	75155 410.7	86428 410.7	75155 410.7	82671 410.7	75155 410.7	75155 410.7	946,954 410.7
1	MISC LD ELEC PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
2	MISC LD GAS PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
3	MISC LD OIL PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
4	MISC LD P STEAM PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
5	MISC LD P HOTW20 PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
6	MISC LD P CHILL PK	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
1	EQ1001S ELEC PK	2-STG CTV <555 TONS												
		0	0	0	0	13858	20730	35324	22954	13093	0	0	0	105,959
		0.0	0.0	0.0	0.0	106.5	171.6	225.3	181.1	134.1	0.0	0.0	0.0	225.3
1	EQ5100 ELEC PK	COOLING TOWER												
		0	0	0	0	5115	5115	4650	5348	4650	0	0	0	24,878
		0.0	0.0	0.0	0.0	23.3	23.3	23.3	23.3	23.3	0.0	0.0	0.0	23.3
1	EQ5100 WATER PK	COOLING TOWER												
		0	0	0	0	73	118	193	130	68	0	0	0	582
		0.0	0.0	0.0	0.0	0.6	0.9	1.2	1.0	0.8	0.0	0.0	0.0	1.2
1	EQ5001 ELEC PK	CHILLED WATER PUMP C.V.												
		0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
		0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5010 ELEC PK	CONDENSER WATER PUMP C.V.												
		0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
		0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5300	CONTROL PANEL & INTERLOCK												

[illegible]

ELEC	6264	5667	5727	2267	0	0	0	0	0	1402	3937	5966	31,230
PK	29.8	29.8	29.8	29.8	0.0	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8

[illegible]

UTILITY PEAK CHECKSUMS - ALTERNATIVE 3
WEATHERSTRIP & CAULKING

----- UTILITY PEAK CHECKSUMS -----

Utility ELECTRIC DEMAND

Peak Value 1,066.7 (kW)
Yearly Time of Peak 14 (hr) 7 (mo)

Hour 14 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Percent Of Tot (%)
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Cooling Equipment

1	EQ1001S	2-STG CTV <555 TONS	309.2	28.98
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Sub Total			309.2	28.98
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Sub Total			0.0	0.00
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Air Moving Equipment

1	SUMMATION OF FAN ELECTRICAL DEMAND		57.3	5.37
3	SUMMATION OF FAN ELECTRICAL DEMAND		74.9	7.02
5	SUMMATION OF FAN ELECTRICAL DEMAND		107.4	10.07
6	SUMMATION OF FAN ELECTRICAL DEMAND		107.3	10.06

Sub Total			346.8	32.51
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Sub Total			0.0	0.00
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Miscellaneous

Lights		410.7	38.50	
Base Utilities		0.0	0.00	
Misc Equipment		0.0	0.00	
Sub Total			410.7	38.50

Grand Total			1,066.7	100.00
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 122

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Relectance: 0.20
Winter Ground Relectance: 0.20

Air Density: 0.0742 (lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 9:31:32 2/ 2/94
Dataset Name: CB122 .TM

AIRFLOW - ALTERNATIVE 4
LOW E GLASS

----- S Y S T E M S U M M A R Y -----

(Design Airflow Quantities)

System Number	System Type	Main					Auxil.	Room
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	TRH	10,853	36,175	36,175	36,175	10,853	0	0
2	SZ	0	17,730	17,730	17,730	0	0	17,730
3	INDFP	5,830	19,435	19,435	36,448	19,435	32,234	0
4	UH	0	0	1,835	0	0	0	0
5	DD	8,357	27,856	27,856	28,824	27,856	0	0
6	DD	8,357	27,856	27,856	28,824	9,325	0	0
Totals		33,397	129,052	130,887	148,000	67,468	32,234	17,730

CAPACITY - ALTERNATIVE 4
LOW E GLASS

----- S Y S T E M S U M M A R Y -----

(Design Capacity Quantities)

System Number	System Type	Cooling					Heating					
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	TRH	81.5	0.0	0.0	81.5	-68,182	0	-480,162	0	0	0	-548,345
2	SZ	3.1	0.0	0.0	3.1	-9,837	0	-106,598	0	0	0	-9,837
3	INDFP	46.4	88.5	0.0	134.9	-680,963	-1,230,942	0	0	0	0	-1,911,905
4	UH	0.0	0.0	0.0	0.0	-6,715	0	0	0	0	0	-6,715
5	DD	61.9	0.0	0.0	61.9	-448,643	0	-373,989	0	0	0	-822,632
6	DD	61.9	0.0	0.0	61.9	-245,454	0	-373,989	0	0	0	-619,443
Totals		254.9	88.5	0.0	343.4	-1,459,795	-1,230,942	-1,334,738	0	0	0	-3,918,877

The building peaked at hour 14 month 7 with a capacity of 254.9 tons

ENGINEERING CHECKS - ALTERNATIVE 4
LOW E GLASS

----- ENGINEERING CHECKS -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	----- Cooling -----				--- Heating ---		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	TRH	30.00	0.63	443.7	705.9	17.00	0.63	-9.53	57,549
2	Main	SZ	0.00	4.32	5,655.8	1,307.9	9.18	4.32	-2.40	4,100
3	Main	INDFP	30.00	0.47	418.7	891.2	13.46	0.47	-16.46	41,364
3	Auxiliary	INDFP	0.00	0.78	364.4	467.7	25.66	0.78	-29.76	41,364
4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.72	-2.64	2,544
5	Main	DD	30.00	1.03	449.8	437.9	27.40	1.03	-30.33	27,121
6	Main	DD	30.00	1.03	449.8	437.9	27.40	1.03	-22.84	27,121

System 1 Peak TRH - TERMINAL REHEAT

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Wall Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Partition	18,940			18,940	1.94	*	18,940	4.00	*	-68,182	-68,182	100.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	18,940	0		18,940	1.94	*	18,940	4.00	*	-68,182	-68,182	100.00
Internal Loads												
Lights	398,781	0		398,781	40.76	*	424,020	89.45	*	0	0	0.00
People	63,941			63,941	6.54	*	31,097	6.56	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	462,722	0	0	462,722	47.30	*	455,117	96.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	406,913	41.59	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				77,173	7.89	*		0.00	*		0	0.00
Ret. Fan Heat		18,007		18,007	1.84	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	-0.00	*	0	-0.00	*	0	0	0.00
Exhaust Heat		-5,402	0	-5,402	-0.55	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	481,661	12,605	0	978,353	100.00	*	474,057	100.00	*	-68,182	-68,182	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	81.5	978.4	36,175	80.0 67.5 83.9	61.0 59.3 74.8	Part	16,570	
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	0	
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Roof	0	0 0
Totals	81.5	978.4				Wall	0	0 0

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	--ENGINEERING CHECKS--	--TEMPERATURES (F)--
	(Mbh)	(cfm)	Deg F	Deg F				Clg % OA	Type Clg Htg
Main Htg	-68.2	36,175	68.0	69.7	Vent	10,853	0	30.0	SADB 63.0 69.7
Aux Htg	0.0	0	0.0	0.0	Infil	0	0	0.63	Plenum 75.0 68.0
Preheat	-480.2	36,175	48.8	61.0	Supply	36,175	36,175	443.70	Return 75.5 68.0
Reheat	-0.0	0	0.0	0.0	Mincfm	36,175	0	705.87	Ret/OA 80.0 68.0
Humidif	0.0	0	0.0	0.0	Return	36,175	36,175	17.00	Runarnd 75.0 68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	10,853	0	137	Fn MtrTD 0.5 0.5
Total	-548.3				Rm Exh	0	0	0.0	Fn BldTD 0.4 0.4
					Auxil	0	0	0.63	Fn Frict 1.1 1.1
								Htg Btuh/SqFt -9.53	

System 2 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/16 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	860		860	2.29	*	0	0.00	*	0	-3,224	44.57
Glass Solar	255	0		255	0.68	*	255	0.74	*	0	0	0.00
Glass Cond	239	0		239	0.64	*	239	0.69	*	-1,139	-1,139	15.75
Wall Cond	747	183		929	2.47	*	747	2.16	*	-2,286	-2,870	39.68
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	1,241	1,042		2,283	6.07	*	1,241	3.60	*	-3,426	-7,234	100.00
Internal Loads						*			*			
Lights	30,623	0		30,623	81.40	*	30,623	88.78	*	0	0	0.00
People	4,712			4,712	12.53	*	2,223	6.44	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	35,335	0	0	35,335	93.93	*	32,845	95.22	*	0	0	0.00
Ceiling Load	1,918	-1,918		0	0.00	*	408	1.18	*	-243	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	-0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	38,494	-876	0	37,618	100.00	*	34,495	100.00	*	-3,668	-7,234	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor		
Main Clg	3.1	37.6	35.1	76.6	68.9	96.6	73.2	68.3	98.9	Part	0	
Aux Clg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0	
Opt Vent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	580	0 0
Totals	3.1	37.6								Wall	196	21 11

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	--ENGINEERING CHECKS--			--TEMPERATURES (F)--		
	(Mbh)	(cfm)	Deg F	Deg F				Clg % OA	0.0	Type	Clg	Htg	
Main Htg	-9.8	17,730	67.7	68.2	Vent	0	0	Clg Cfm/Sqft	4.32	SAOB	73.2	68.2	
Aux Htg	0.0	0	0.0	0.0	Infil	0	0	Clg Cfm/Ton	5655.81	Plenum	76.5	67.7	
Preheat	-106.6	17,730	67.7	73.2	Supply	17,730	17,730	Clg Sqft/Ton	1307.89	Return	79.7	67.7	
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	9.18	Ret/OA	76.6	67.7	
Humidif	0.0	0	0.0	0.0	Return	0	17,730	No. People	10	Runarnd	75.0	68.0	
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0	
Total	-9.8				Rm Exh	17,730	0	Htg Cfm/Sqft	4.32	Fn BldTD	0.0	0.0	
					Auxil	0	0	Htg Btuh/Sqft	-2.40	Fn Frict	0.0	0.0	

System 3 Block INDFP - 4-PIPE INDUCTION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/19 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 85 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	474	21,484		21,957	1.29	*	664	0.12	*	-1,579	-73,446	3.84
Glass Solar	77,250	0		77,250	4.52	*	81,767	14.31	*	0	0	0.00
Glass Cond	53,830	0		53,830	3.15	*	40,082	7.01	*	-276,287	-276,287	14.45
Wall Cond	113,330	16,902		130,232	7.62	*	168,977	29.57	*	-328,407	-377,319	19.74
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	736,354			736,354	43.11	*	170,578	29.85	*	-1,184,852	-1,184,852	61.97
Sub Total==>	981,237	38,386		1,019,623	59.69	*	462,068	80.85	*	-1,791,125	-1,911,905	100.00
Internal Loads												
Lights	277,628	0		277,628	16.25	*	79,744	13.95	*	0	0	0.00
People	45,248			45,248	2.65	*	6,070	1.06	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	322,876	0	0	322,876	18.90	*	85,814	15.02	*	0	0	0.00
Ceiling Load	14,654	-14,654		0	0.00	*	23,486	4.11	*	-47,811	0	0.00
Outside Air	0	0	0	252,361	14.77	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				110,564	6.47	*		0.00	*		0	0.00
Ret. Fan Heat		13,820		13,820	0.81	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	119			119	0.01	*	119	0.02	*	0	0	0.00
Exhaust Heat		-11,266	0	-11,266	-0.66	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	1,318,886	26,287	0	1,708,098	100.00	*	571,487	100.00	*	-1,838,936	-1,911,905	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	46.4	557.0	402.9	19,435 80.9 66.7 78.0	59.9 57.7 69.7	41,364		
Aux Clg	88.5	1,061.4	676.6	32,234 75.0 63.9 73.7	65.1 52.9 41.7	0		
Opt Vent	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	134.9	1,618.4				14,680	0	0
						28,354	5,152	18

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA		Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent	5,830	0	Clg Cfm/Sqft	0.47	SADB	65.1	96.7
Main Htg	-681.0	19,435	64.5	96.7	Infil	17,013	17,013	Clg Cfm/Ton	418.73	Plenum	76.1	64.4
Aux Htg	-1,230.9	32,234	68.0	103.1	Supply	19,435	19,435	Clg Sqft/Ton	891.20	Return	76.8	64.5
Preheat	-0.0	19,435	64.5	59.9	Mincfm	0	0	Clg Btuh/Sqft	13.46	Ret/OA	80.9	64.5
Reheat	0.0	0	0.0	0.0	Return	19,435	19,435	No. People	98	Runarnd	75.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	5,830	0	Htg % OA	0.0	Fn MtrTD	1.3	1.3
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	0.47	Fn BldTD	1.0	1.0
Total	-1,911.9				Auxil	32,234	32,234	Htg Btuh/Sqft	-16.46	Fn Frict	2.9	2.9

System 4 Block UH - UNIT HEATERS

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Percent		Space	Percent		Space Peak	Coil Peak	Percent
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Wall Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Partition	0			0	0.00	*	0	0.00	*	-6,715	-6,715	100.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-6,715	-6,715	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-6,715	-6,715	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Part	2,544	
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	1,632	
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Roof	0	0 0
Totals	0.0	0.0				Wall	0	0 0

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
(Mbh)	(cfm)	Deg F	Deg F	Vent			Clg Cfm/Sqft	0.00	SADB	0.0	71.4
Main Htg	-6.7	1,835	68.0	71.4	Infil	0	Clg Cfm/Ton	0.00	Plenum	0.0	68.0
Aux Htg	0.0	0	0.0	0.0	Supply	0	Clg Sqft/Ton	0.00	Return	0.0	68.0
Preheat	0.0	0	0.0	0.0	Mincfm	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	68.0
Reheat	0.0	0	0.0	0.0	Return	0	No. People	0	Runarnd	0.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	Htg Cfm/Sqft	0.72	Fn BldTD	0.0	0.0
Total	-6.7				Auxil	0	Htg Btuh/Sqft	-2.64	Fn Frict	0.1	0.0

System 5 Block 00 - DOUBLE DUCT

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Percent Of Tot (%)	*	Space Sensible (Btuh)	Percent Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Percent Of Tot (%)
Envelope Loads												
Skylite Solr	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	14,486	0	0	14,486	1.95	*	16,221	5.94	*	-48,286	-48,286	21.28
Glass Solar	8,014	0	0	8,014	1.08	*	7,222	2.64	*	0	0	0.00
Glass Cond	4,840	0	0	4,840	0.65	*	5,167	1.89	*	-24,690	-24,690	10.88
Wall Cond	4,161	526	0	4,687	0.63	*	5,622	2.06	*	-16,677	-18,921	8.34
Partition	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	32,866	0	0	32,866	4.42	*	16,324	5.98	*	-67,403	-67,403	29.70
Sub Total==>	64,366	526	0	64,892	8.73	*	50,556	18.52	*	-157,056	-159,300	70.19
Internal Loads												
Lights	190,447	0	0	190,447	25.63	*	200,839	73.56	*	0	0	0.00
People	30,203	0	0	30,203	4.06	*	14,612	5.35	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	220,650	0	0	220,650	29.69	*	215,452	78.91	*	0	0	0.00
Ceiling Load	1,375	-1,375	0	0	0.00	*	1,553	0.57	*	-4,627	0	0.00
Outside Air	0	0	0	283,790	38.19	*	0	0.00	*	0	0	0.00
Sup. Fan Heat	0	0	0	158,470	21.32	*	0	0.00	*	0	0	0.00
Ret. Fan Heat	0	19,809	0	19,809	2.67	*	0	0.00	*	0	0	0.00
Duct Heat Pkup	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
OV/UNDR Sizing	5,476	0	0	5,476	0.74	*	5,476	2.01	*	-67,648	-67,648	29.81
Exhaust Heat	0	-9,934	0	-9,934	-1.34	*	0	0.00	*	0	0	0.00
Terminal Bypass	0	0	0	0	-0.00	*	0	0.00	*	0	0	0.00
Grand Total==>	291,866	9,026	0	743,152	100.00	*	273,035	100.00	*	-229,331	-226,948	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
				Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor	27,121	
Main Clg	61.9	743.2	567.3	80.4	68.4	87.5	60.8	60.4	80.0	Part	0	
Aux Clg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0	
Opt Vent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	8,563	0 0
Totals	61.9	743.2								Wall	1,613	460 29

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	--ENGINEERING CHECKS--			--TEMPERATURES (F)---		
								Clg % OA	30.0		Type	Clg	Htg
Main Htg	-448.6	27,856	60.8	75.6	Vent	8,357	0	Clg Cfm/Sqft	1.03		SADB	66.0	75.6
Aux Htg	0.0	0	0.0	0.0	Infil	968	968	Clg Cfm/Ton	449.80		Plenum	75.4	66.5
Preheat	-374.0	27,856	48.4	60.8	Supply	27,856	27,856	Clg Sqft/Ton	437.93		Return	76.1	67.5
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	27.40		Ret/OA	80.4	67.5
Humidif	0.0	0	0.0	0.0	Return	27,856	27,856	No. People	65		Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	8,357	0	Htg % OA	0.0		Fn MtrTD	1.3	1.3
Total	-822.6				Rm Exh	0	0	Htg Cfm/Sqft	1.03		Fn BldTD	1.0	1.0
					Auxil	0	0	Htg Btuh/Sqft	-30.33		Fn Frict	2.9	2.9

System 6 Block DD - DOUBLE DUCT

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct	Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot	Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)	(Btuh)	(Btuh)	(%)
Envelope Loads											
Skylite Solr	0	0		0	0.00		0	0.00	0	0	0.00
Skylite Cond	0	0		0	0.00		0	0.00	0	0	0.00
Roof Cond	14,486	0		14,486	1.95		16,221	5.94	-48,286	-48,286	21.28
Glass Solar	8,014	0		8,014	1.08		7,222	2.64	0	0	0.00
Glass Cond	4,840	0		4,840	0.65		5,167	1.89	-24,690	-24,690	10.88
Wall Cond	4,161	526		4,687	0.63		5,622	2.06	-16,677	-18,921	8.34
Partition	0			0	0.00		0	0.00	0	0	0.00
Exposed Floor	0			0	0.00		0	0.00	0	0	0.00
Infiltration	32,866			32,866	4.42		16,324	5.98	-67,403	-67,403	29.70
Sub Total==>	64,366	526		64,892	8.73		50,556	18.52	-157,056	-159,300	70.19
Internal Loads											
Lights	190,447	0		190,447	25.63		200,839	73.56	0	0	0.00
People	30,203			30,203	4.06		14,612	5.35	0	0	0.00
Misc	0	0	0	0	0.00		0	0.00	0	0	0.00
Sub Total==>	220,650	0	0	220,650	29.69		215,452	78.91	0	0	0.00
Ceiling Load	1,375	-1,375		0	0.00		1,553	0.57	-4,627	0	0.00
Outside Air	0	0	0	283,790	38.19		0	0.00	0	0	0.00
Sup. Fan Heat				158,470	21.32			0.00		0	0.00
Ret. Fan Heat		19,809		19,809	2.67			0.00		0	0.00
Duct Heat Pkup		0		0	0.00			0.00		0	0.00
OV/UNDR Sizing	5,476			5,476	0.74		5,476	2.01	-67,648	-67,648	29.81
Exhaust Heat		-9,934	0	-9,934	-1.34			0.00		0	0.00
Terminal Bypass		0	0	0	-0.00			0.00		0	0.00
Grand Total==>	291,866	9,026	0	743,152	100.00		273,035	100.00	-229,331	-226,948	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	61.9	743.2	567.3	27,856 80.4 68.4 87.5	60.8 60.4 80.0	27,121		
Aux Clg	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Opt Vent	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	61.9	743.2				Roof	8,563	0 0
						Wall	1,613	460 29

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	30.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F				Clg Cfm/Sqft	1.03	SADB	66.0	75.6
Main Htg	-245.5	27,856	67.5	75.6	Vent	8,357	0	Clg Cfm/Ton	449.80	Plenum	75.4	66.5
Aux Htg	0.0	0	0.0	0.0	Infil	968	968	Clg Sqft/Ton	437.93	Return	76.1	67.5
Preheat	-374.0	27,856	48.4	60.8	Supply	27,856	27,856	Clg Btuh/Sqft	27.40	Ret/OA	80.4	67.5
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	No. People	65	Runarnd	75.0	68.0
Humidif	0.0	0	0.0	0.0	Return	27,856	27,856	Htg % OA	0.0	Fn MtrTD	1.3	1.3
Opt Vent	0.0	0	0.0	0.0	Exhaust	8,357	0	Htg Cfm/Sqft	1.03	Fn BldTD	1.0	1.0
Total	-619.4				Rm Exh	0	0	Htg Btuh/Sqft	-22.84	Fn Frict	2.9	2.9
					Auxil	0	0					

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

BUILDING U-VALUES - ALTERNATIVE 4
LOW E GLASS

----- B U I L D I N G U - V A L U E S -----

Room Number	Description	Part.	ExFlr	Room U-Values (Btu/hr/sqft/F)							Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
				Summr Skylt	Wintr Skylt	Summr Roof	Wintr Windo	Windo	Wall	Ceil.		
1	SUB BSMT, BSMT W	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
Zone	1 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
4	BSMT E	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
Zone	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
System	1 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.4	9.54
2	TOILETS, KITCHEN	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	29.4	5.93
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	29.4	5.93
11	TOILETS W ROOF	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
Zone	11 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	35.3	7.23
3	STAIRS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.229	0.000	103.3	21.63
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.229	0.000	103.3	21.63
5	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	57.9	12.05
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	57.9	12.05
7	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	56.7	11.81
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	56.7	11.81
9	3RD FL OFFICES	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	102.3	21.84
Zone	9 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	102.3	21.84
12	STAIRS W ROOF	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.229	0.000	146.4	31.13
Zone	12 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.229	0.000	146.4	31.13
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.256	0.317	74.1	15.63
13	SUPPLY STORAGE	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
Zone	13 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
System	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
6	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
8	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
10	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
Zone	10 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
System	5 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	43.1	8.94
14	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
Zone	14 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
15	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
Zone	15 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
16	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
Zone	16 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
System	6 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	43.1	8.94
Building		0.229	0.000	0.000	0.000	0.088	0.810	0.837	0.256	0.317	52.6	10.93

BUILDING AREAS - ALTERNATIVE 4
LOW E GLASS

----- B U I L D I N G A R E A S -----

Room Number	Description	Number of Duplicate Flr Rm		Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	SUB BSMT, BSMT W	1	1	45,125	45,125	13,222	0	0	0	0	0	0	0
Zone	1 Total/Ave.				45,125	13,222	0	0	0	0	0	0	0
4	BSMT E	1	1	12,424	12,424	3,348	0	0	0	0	0	0	0
Zone	4 Total/Ave.				12,424	3,348	0	0	0	0	0	0	0
System	1 Total/Ave.				57,549	16,570	0	0	0	0	0	0	0
2	TOILETS, KITCHEN	1	1	3,520	3,520	0	0	0	0	0	21	11	174
Zone	2 Total/Ave.				3,520	0	0	0	0	0	21	11	174
11	TOILETS W ROOF	1	1	580	580	0	0	0	0	580	0	0	0
Zone	11 Total/Ave.				580	0	0	0	0	580	0	0	0
System	2 Total/Ave.				4,100	0	0	0	0	580	21	11	174
3	STAIRS	1	1	560	560	0	0	0	0	0	255	29	625
Zone	3 Total/Ave.				560	0	0	0	0	0	255	29	625
5	1ST FL OFFICES	1	1	11,724	11,724	0	0	0	0	0	1,573	19	6,530
Zone	5 Total/Ave.				11,724	0	0	0	0	0	1,573	19	6,530
7	2ND FL OFFICES	1	1	14,400	14,400	0	0	0	0	0	1,610	17	7,730
Zone	7 Total/Ave.				14,400	0	0	0	0	0	1,610	17	7,730
9	3RD FL OFFICES	1	1	14,400	14,400	0	0	0	0	14,400	1,610	17	8,010
Zone	9 Total/Ave.				14,400	0	0	0	0	14,400	1,610	17	8,010
12	STAIRS W ROOF	1	1	280	280	0	0	0	0	280	105	25	307
Zone	12 Total/Ave.				280	0	0	0	0	280	105	25	307
System	3 Total/Ave.				41,364	0	0	0	0	14,680	5,152	18	23,202
13	SUPPLY STORAGE	1	1	2,544	2,544	1,632	0	0	0	0	0	0	0
Zone	13 Total/Ave.				2,544	1,632	0	0	0	0	0	0	0
System	4 Total/Ave.				2,544	1,632	0	0	0	0	0	0	0
6	1ST FL CEN OFFCS	1	1	9,884	9,884	0	0	0	0	0	250	19	1,038
Zone	6 Total/Ave.				9,884	0	0	0	0	0	250	19	1,038
8	2ND FL CEN OFFCS	1	1	8,674	8,674	0	0	0	0	0	105	66	55
Zone	8 Total/Ave.				8,674	0	0	0	0	0	105	66	55
10	3RD FL CEN OFFCS	1	1	8,563	8,563	0	0	0	0	8,563	105	64	60
Zone	10 Total/Ave.				8,563	0	0	0	0	8,563	105	64	60
System	5 Total/Ave.				27,121	0	0	0	0	8,563	460	29	1,153
14	1ST FL CEN OFFCS	1	1	9,884	9,884	0	0	0	0	0	250	19	1,038
Zone	14 Total/Ave.				9,884	0	0	0	0	0	250	19	1,038
15	2ND FL CEN OFFCS	1	1	8,674	8,674	0	0	0	0	0	105	66	55
Zone	15 Total/Ave.				8,674	0	0	0	0	0	105	66	55
16	3RD FL CEN OFFCS	1	1	8,563	8,563	0	0	0	0	8,563	105	64	60
Zone	16 Total/Ave.				8,563	0	0	0	0	8,563	105	64	60
System	6 Total/Ave.				27,121	0	0	0	0	8,563	460	29	1,153
Building					159,799	18,202	0	0	0	32,386	6,095	19	25,681

ASHRAE 90 ANALYSIS - ALTERNATIVE 4
LOW E GLASS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.088 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.362 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.224 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.96 (Btu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTVw) = 15.92 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 4
LOW E GLASS

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	17.2	0	0	-201,274	18	246	6,544.3	0	0	0.0	0	0
5 - 10	34.3	0	4	-402,547	5	69	13,088.7	0	0	0.0	0	0
10 - 15	51.5	7	76	-603,821	4	57	19,633.1	0	0	0.0	0	0
15 - 20	68.7	9	100	-805,095	6	86	26,177.4	0	0	0.0	0	0
20 - 25	85.8	14	151	-1,006,369	2	32	32,721.7	0	0	0.0	0	0
25 - 30	103.0	4	45	-1,207,642	8	106	39,266.1	0	0	0.0	0	0
30 - 35	120.2	11	113	-1,408,916	8	107	45,810.5	0	0	0.0	0	0
35 - 40	137.4	19	201	-1,610,190	27	363	52,354.8	0	0	0.0	0	0
40 - 45	154.5	3	30	-1,811,464	15	202	58,899.2	0	0	0.0	0	0
45 - 50	171.7	6	60	-2,012,738	7	94	65,443.5	0	0	0.0	0	0
50 - 55	188.9	6	67	-2,214,012	0	0	71,987.9	0	0	0.0	0	0
55 - 60	206.0	2	23	-2,415,285	0	0	78,532.2	0	0	0.0	0	0
60 - 65	223.2	4	40	-2,616,559	0	0	85,076.6	0	0	0.0	0	0
65 - 70	240.4	8	90	-2,817,833	0	0	91,620.9	0	0	0.0	0	0
70 - 75	257.5	4	45	-3,019,106	0	0	98,165.3	0	0	0.0	0	0
75 - 80	274.7	2	25	-3,220,380	0	0	104,709.6	0	0	0.0	0	0
80 - 85	291.9	0	0	-3,421,654	0	0	111,254.0	0	0	0.0	0	0
85 - 90	309.0	0	0	-3,622,928	0	0	117,798.3	100	2,520	0.0	0	0
90 - 95	326.2	0	0	-3,824,202	0	0	124,342.7	0	0	0.0	0	0
95 - 100	343.4	0	0	-4,025,475	0	0	130,887.0	0	0	0.0	0	0
Hours Off	0.0	0	7,690	0	0	7,398	0.0	0	6,240	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 4
LOW E GLASS

----- BUILDING TEMPERATURE PROFILES -----

Temperature Range (F)	Zone Number															
	1	4	2	11	3	5	7	9	12	13	6	8	10	14	15	16
Max. Temp.	82.6	81.5	198.7	120.2	84.1	84.0	83.8	81.8	83.1	96.2	84.3	88.1	84.2	84.3	88.1	84.2
Mo./Hr.	10 21	10 23	9 18	8 16	7 22	7 24	7 23	7 24	7 24	8 17	7 3	10 2	7 6	7 3	10 2	7 6
Day Type	2	2	2	2	1	1	1	1	1	2	5	2	5	5	2	5
..... Number of Hours																
Above 100	0	0	8,016	4,086	0	0	0	0	0	0	0	0	0	0	0	0
95 - 100	0	0	0	110	0	0	0	0	0	240	0	0	0	0	0	0
90 - 95	0	0	91	1,239	0	0	0	0	0	1,494	0	0	0	0	0	0
85 - 90	0	0	290	253	0	0	0	0	0	1,602	0	453	0	0	453	0
80 - 85	954	517	227	585	657	850	868	477	570	1,215	1,726	2,982	1,538	1,726	2,961	1,538
75 - 80	5,027	2,814	136	327	1,900	2,026	2,072	2,297	1,992	818	3,122	4,726	3,751	3,174	4,626	3,746
70 - 75	1,202	3,711	0	1,256	920	731	672	915	1,075	1,435	1,338	599	1,315	1,174	675	1,308
65 - 70	1,418	1,516	0	726	1,353	1,528	1,562	1,609	1,305	1,579	1,370	0	1,537	1,376	45	1,451
60 - 65	159	202	0	178	957	966	993	1,252	984	377	485	0	442	573	0	510
55 - 60	0	0	0	0	1,027	1,060	1,057	927	1,150	0	329	0	177	325	0	207
50 - 55	0	0	0	0	716	687	643	546	728	0	387	0	0	406	0	0
Below 50	0	0	0	0	1,230	912	893	737	956	0	3	0	0	6	0	0
Min. Temp.	63.8	63.0	68.0	63.6	32.4	33.6	33.7	36.3	34.1	61.7	50.0	67.9	57.4	49.8	67.9	57.2
Mo./Hr.	1 8	1 10	1 1	2 6	2 11	2 7	2 7	2 7	2 7	1 6	2 7	1 7	1 7	2 7	1 7	1 7
Day Type	5	5	1	5	4	5	5	5	5	5	5	1	5	5	1	5

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 4
LOW E GLASS

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	STEAM On Peak (Thrm)	WATER (1000 G1)	STEAM DMND On Peak (Thrm/hr)
Jan	163,358	813	12,331	0	72
Feb	147,800	813	11,547	0	72
March	178,338	813	9,310	0	66
April	150,842	813	2,990	0	48
May	190,942	946	0	70	0
June	196,626	1,002	0	108	0
July	194,441	1,057	0	182	0
Aug	206,928	1,017	0	120	0
Sept	173,936	964	0	65	0
Oct	165,117	813	1,997	0	47
Nov	152,835	813	5,066	0	60
Dec	155,579	813	10,554	0	71
Total	2,076,741	1,057	53,795	544	72

Building Energy Consumption = 78,019 (Btu/Sq Ft/Year)
Source Energy Consumption = 177,964 (Btu/Sq Ft/Year)

Floor Area = 159,799 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION

Ref Num	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	78913	71397	86428	75155	82671	82671	75155	86428	75155	82671	75155	75155	946,954
	PK	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7
1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTW20	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1001S		2-STG CTV <555 TONS											
	ELEC	0	0	0	0	13526	19210	33154	21448	12650	0	0	0	99,988
	PK	0.0	0.0	0.0	0.0	104.7	160.8	215.4	175.6	122.5	0.0	0.0	0.0	215.4
1	EQ5100		COOLING TOWER											
	ELEC	0	0	0	0	5115	5115	4650	5348	4650	0	0	0	24,878
	PK	0.0	0.0	0.0	0.0	23.3	23.3	23.3	23.3	23.3	0.0	0.0	0.0	23.3
1	EQ5100		COOLING TOWER											
	WATER	0	0	0	0	70	108	182	120	65	0	0	0	544
	PK	0.0	0.0	0.0	0.0	0.6	0.9	1.1	1.0	0.7	0.0	0.0	0.0	1.1
1	EQ5001		CHILLED WATER PUMP C.V.											
	ELEC	0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
	PK	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5010		CONDENSER WATER PUMP C.V.											
	ELEC	0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
	PK	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5300		CONTROL PANEL & INTERLOCK											

	ELEC	0	0	0	0	220	220	200	230	200	0	0	0	1,070
	PK	0.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0
2	EQ1000	PREVENTS COOLING ENERGY												
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5001	CHILLED WATER PUMP C.V.												
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5010	CONDENSER WATER PUMP C.V.												
	ELEC	0	0	0	0	- 0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	9754	8825	10683	9290	10219	10219	9290	10683	9290	10219	9290	9290	117,051
	PK	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4
1	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	2276	2059	2493	2168	2384	2384	2168	2493	2168	2384	2168	2168	27,312
	PK	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
2	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	13975	12644	15305	13309	14640	14640	13309	15305	13309	14640	13309	13309	167,695
	PK	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5
3	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	1747	1580	1913	1664	1830	1830	1664	1913	1664	1830	1664	1664	20,962
	PK	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
5	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	20030	18122	21937	19076	20983	20983	19076	21937	19076	20983	19076	19076	240,355
	PK	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4
5	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	2504	2265	2742	2384	2623	2623	2384	2742	2384	2623	2384	2384	30,044
	PK	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9
6	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	20030	18122	21937	19076	20983	20983	19076	21937	19076	20983	19076	19076	240,355
	PK	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4
6	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	2504	2265	2742	2384	2623	2623	2384	2742	2384	2623	2384	2384	30,044
	PK	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9
1	EQ2101	PURCHASED DISTRICT STEAM												
	P STEAM	2113	1979	1589	512	0	0	0	0	0	335	859	1809	9,197
	PK	12.4	12.4	11.3	8.2	0.0	0.0	0.0	0.0	0.0	8.0	10.4	12.2	12.4
1	EQ5020	HEAT WATER CIRC. PUMP C.V.												

[illegible]

UTILITY PEAK CHECKSUMS - ALTERNATIVE 4
LOW E GLASS

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 1,056.7 (kW)
Yearly Time of Peak 14 (hr) 7 (mo)

Hour 14 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Percent Of Tot (%)
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Cooling Equipment

1	EQ1001S	2-STG CTV <555 TONS	299.3	28.32
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Sub Total			299.3	28.32
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Sub Total			0.0	0.00
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Air Moving Equipment

1		SUMMATION OF FAN ELECTRICAL DEMAND	57.3	5.42
3		SUMMATION OF FAN ELECTRICAL DEMAND	74.9	7.08
5		SUMMATION OF FAN ELECTRICAL DEMAND	107.3	10.15
6		SUMMATION OF FAN ELECTRICAL DEMAND	107.3	10.15

Sub Total			346.8	32.81
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Sub Total			0.0	0.00
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Miscellaneous

Lights			410.7	38.86
Base Utilities			0.0	0.00
Misc Equipment			0.0	0.00
Sub Total			410.7	38.86

Grand Total			1,056.7	100.00
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**          T R A C E    6 0 0    A N A L Y S I S          **  
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 122

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Reflectance: 0.20
Winter Ground Reflectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 11:42:49 2/ 2/94
Dataset Name: CB122B .TM

AIRFLOW - ALTERNATIVE 1
REPLACE FLUORESCENT LAMPS

----- S Y S T E M S U M M A R Y -----
(Design Airflow Quantities)

System Number	System Type	----- Main -----					Auxil. Supply	Room Exhaust
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Airflow (Cfm)	Airflow (Cfm)
1	TRH	10,853	36,175	36,175	36,175	10,853	0	0
2	SZ	0	17,730	17,730	17,730	0	0	17,730
3	INDFP	5,830	19,435	19,435	36,448	19,435	35,813	0
4	UH	0	0	1,835	0	0	0	0
5	DD	8,357	27,856	27,856	28,824	27,856	0	0
6	DD	8,357	27,856	27,856	28,824	9,325	0	0
Totals		33,397	129,052	130,887	148,000	67,468	35,813	17,730

CAPACITY - ALTERNATIVE 1
REPLACE FLUORESCENT LAMPS

----- S Y S T E M S U M M A R Y -----
(Design Capacity Quantities)

System Number	System Type	----- Cooling -----					----- Heating -----					
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	TRH	76.6	0.0	0.0	76.6	-68,182	0	-523,059	0	0	0	-591,242
2	SZ	2.9	0.0	0.0	2.9	-9,837	0	-109,353	0	0	0	-9,837
3	INDFP	46.4	101.4	0.0	147.8	-680,963	-1,230,942	0	0	0	0	-1,911,905
4	UH	0.0	0.0	0.0	0.0	-6,715	0	0	0	0	0	-6,715
5	DD	60.7	0.0	0.0	60.7	-437,529	0	-385,103	0	0	0	-822,632
6	DD	60.7	0.0	0.0	60.7	-245,454	0	-385,103	0	0	0	-630,557
Totals		247.3	101.4	0.0	348.7	-1,448,680	-1,230,942	-1,402,619	0	0	0	-3,972,888

The building peaked at hour 14 month 7 with a capacity of 247.3 tons

ENGINEERING CHECKS - ALTERNATIVE 1
REPLACE FLUORESCENT LAMPS

----- ENGINEERING CHECKS -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	Cooling				Heating		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	TRH	30.00	0.63	472.2	751.1	15.98	0.63	-10.27	57,549
2	Main	SZ	0.00	4.32	6,103.3	1,411.4	8.50	4.32	-2.40	4,100
3	Main	INDFP	30.00	0.47	418.7	891.2	13.46	0.47	-16.46	41,364
3	Auxiliary	INDFP	0.00	0.87	353.3	408.1	29.40	0.87	-29.76	41,364
4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.72	-2.64	2,544
5	Main	DD	30.00	1.03	458.9	446.8	26.86	1.03	-30.33	27,121
6	Main	DD	30.00	1.03	458.9	446.8	26.86	1.03	-23.25	27,121

System 1 Peak TRH - TERMINAL REHEAT

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Percnt		Space	Percnt		Space Peak	Coil Peak	Percnt
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Wall Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Partition	18,940			- 18,940	2.06	*	18,940	4.39	*	-68,182	-68,182	100.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	18,940	0		18,940	2.06	*	18,940	4.39	*	-68,182	-68,182	100.00
Internal Loads												
Lights	358,437	0		358,437	38.99	*	381,123	88.39	*	0	0	0.00
People	63,941			63,941	6.95	*	31,097	7.21	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	422,378	0	0	422,378	45.94	*	412,220	95.61	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	388,314	42.24	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				77,173	8.39	*		0.00	*		0	0.00
Ret. Fan Heat		18,007		18,007	1.96	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	-0.00	*	0	-0.00	*	0	0	0.00
Exhaust Heat		-5,402	0	-5,402	-0.59	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	441,318	12,605	0	919,411	100.00	*	431,160	100.00	*	-68,182	-68,182	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	76.6	919.4	679.2	80.0 67.9 85.7	62.1 60.2 77.2	Part	16,570	
Aux Clg	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	0	
Opt Vent	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	Roof	0	0 0
Totals	76.6	919.4				Wall	0	0 0

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	30.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent	10,853	0	Clg Cfm/Sqft	0.63	SADB	64.0	69.7
Main Htg	-68.2	36,175	68.0	69.7	Infil	0	0	Clg Cfm/Ton	472.15	Plenum	75.0	68.0
Aux Htg	0.0	0	0.0	0.0	Supply	36,175	36,175	Clg Sqft/Ton	751.12	Return	75.5	68.0
Preheat	-523.1	36,175	48.8	62.1	MinCFM	36,175	0	Clg Btuh/Sqft	15.98	Ret/OA	80.0	68.0
Reheat	-0.0	0	0.0	0.0	Return	36,175	36,175	No. People	137	Runarnd	75.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	10,853	0	Htg % OA	0.0	Fn MtrTD	0.5	0.5
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	0.63	Fn BldTD	0.4	0.4
Total	-591.2				Auxil	0	0	Htg Btuh/Sqft	-10.27	Fn Frict	1.1	1.1

-----AIRFLWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 2 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==> Mo/Hr: 7/16 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 * OADB: 91 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Percent Of Tot (%)	*	Space Sensible (Btuh)	Percent Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Percent Of Tot (%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	860		860	2.47	*	0	0.00	*	0	-3,224	44.57
Glass Solar	595	0		595	1.71	*	595	1.87	*	0	0	0.00
Glass Cond	239	0		239	0.69	*	239	0.75	*	-1,139	-1,139	15.75
Wall Cond	747	183		929	2.67	*	747	2.35	*	-2,286	-2,870	39.68
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	1,581	1,042		2,623	7.52	*	1,581	4.98	*	-3,426	-7,234	100.00
Internal Loads						*			*			
Lights	27,525	0		27,525	78.96	*	27,525	86.72	*	0	0	0.00
People	4,712			4,712	13.52	*	2,223	7.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	32,237	0	0	32,237	92.48	*	29,747	93.72	*	0	0	0.00
Ceiling Load	1,918	-1,918		0	0.00	*	411	1.30	*	-243	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	-0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	35,736	-876	0	34,860	100.00	*	31,739	100.00	*	-3,668	-7,234	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
				Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor		
Main Clg	2.9	34.9	17,730	76.6	69.0	97.1	73.4	68.4	99.4	4,100		
Aux Clg	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	0	
Opt Vent	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0	
Totals	2.9	34.9								Roof	580	0 0
										Wall	196	21 11

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	--ENGINEERING CHECKS--			--TEMPERATURES (F)--		
								Clg % OA	0.0		Type	Clg	Htg
Main Htg	-9.8	17,730	67.7	68.2	Vent	0	0	Clg Cfm/Sqft	4.32		SADB	73.4	68.2
Aux Htg	0.0	0	0.0	0.0	Infil	0	0	Clg Cfm/Ton	6103.28		Plenum	76.5	67.7
Preheat	-109.4	17,730	67.7	73.4	Supply	17,730	17,730	Clg Sqft/Ton	1411.36		Return	79.7	67.7
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	8.50		Ret/OA	76.6	67.7
Humidif	0.0	0	0.0	0.0	Return	0	17,730	No. People	10		Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0		Fn MtrTD	0.0	0.0
Total	-9.8				Rm Exh	17,730	0	Htg Cfm/Sqft	4.32		Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/Sqft	-2.40		Fn Frict	0.0	0.0

System 3 Block INDFP - 4-PIPE INDUCTION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/19 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 85 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	474	21,484		21,957	1.24	*	664	0.10	*	-1,579	-73,446	3.84
Glass Solar	171,927	0		171,927	9.69	*	185,822	27.84	*	0	0	0.00
Glass Cond	53,830	0		53,830	3.03	*	40,082	6.01	*	-276,287	-276,287	14.45
Wall Cond	113,330	16,902		130,232	7.34	*	168,977	25.32	*	-328,407	-377,319	19.74
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	736,354			736,354	41.49	*	170,578	25.56	*	-1,184,852	-1,184,852	61.97
Sub Total==>	1,075,915	38,386		1,114,301	62.79	*	566,123	84.82	*	-1,791,125	-1,911,905	100.00
Internal Loads												
Lights	249,542	0		249,542	14.06	*	71,677	10.74	*	0	0	0.00
People	45,248			45,248	2.55	*	6,070	0.91	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	294,790	0	0	294,790	16.61	*	77,746	11.65	*	0	0	0.00
Ceiling Load	14,654	-14,654		0	0.00	*	23,486	3.52	*	-47,811	0	0.00
Outside Air	0	0	0	252,361	14.22	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				110,564	6.23	*		0.00	*		0	0.00
Ret. Fan Heat		13,820		13,820	0.78	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	119			119	0.01	*	119	0.02	*	0	0	0.00
Exhaust Heat		-11,266	0	-11,266	-0.63	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	1,385,477	26,287	0	1,774,689	100.00	*	667,475	100.00	*	-1,838,936	-1,911,905	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	46.4	557.0	402.9	19,435 80.9 66.7 78.0	59.9 57.7 69.7	41,364		
Aux Clg	101.4	1,216.2	743.2	35,813 75.0 64.5 76.4	65.1 53.2 43.1	0		
Opt Vent	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	147.8	1,773.2				0		
						Roof	14,680	0 0
						Wall	28,354	5,152 18

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % GA	30.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F								
Main Htg	-681.0	19,435	64.5	96.7	Vent	5,830	0	Clg Cfm/Sqft	0.47	SADB	65.1	96.7
Aux Htg	-1,230.9	35,813	68.0	99.6	Infil	17,013	17,013	Clg Cfm/Ton	418.73	Plenum	76.1	64.4
Preheat	-0.0	19,435	64.5	59.9	Supply	19,435	19,435	Clg Sqft/Ton	891.20	Return	76.8	64.5
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	13.46	Ret/OA	80.9	64.5
Humidif	0.0	0	0.0	0.0	Return	19,435	19,435	No. People	98	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	5,830	0	Htg % GA	0.0	Fn MtrTD	1.3	1.3
Total	-1,911.9				Rm Exh	0	0	Htg Cfm/SqFt	0.47	Fn BldTD	1.0	1.0
					Auxil	35,813	35,813	Htg Btuh/SqFt	-16.46	Fn Frict	2.9	2.9

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 4 Block UH - UNIT HEATERS

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads						*			*			
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Wall Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Partition	0			0	0.00	*	0	0.00	*	-6,715	-6,715	100.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-6,715	-6,715	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-6,715	-6,715	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total Floor Part ExFlr Roof Wall	AREAS Glass (sf) (%)
Main Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	2,544	
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	1,632	
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0	0 0
Totals	0.0	0.0	0			0	0 0

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	AIRFLOWS (cfm) Cooling Heating	ENGINEERING CHECKS-- Clg % OA Clg Cfm/Sqft Clg Cfm/Ton Clg Btuh/Sqft No. People Htg % OA Htg Cfm/Sqft Htg Btuh/Sqft	TEMPERATURES (F) Type Clg Htg
Main Htg	-6.7	1,835	68.0	71.4	Vent	0 0	0.0 0.00 0.00 0.00 0 Runarnd 0.0 0.0	0.0 71.4
Aux Htg	0.0	0	0.0	0.0	Infil	0 0	0.0 0.00 0.00 0.00 0 Fn MtrTD 0.0 0.0	0.0 68.0
Preheat	0.0	0	0.0	0.0	Supply	0 1,835	0.0 0.00 0.00 0.00 0 Fn BldTD 0.0 0.0	0.0 68.0
Reheat	0.0	0	0.0	0.0	Mincfm	0 0	0.0 0.00 0.00 0.00 0 Fn Frict 0.1 0.0	0.0 68.0
Humidif	0.0	0	0.0	0.0	Return	0 1,835	0.0 0.00 0.00 0.00 0	0.0 68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0 0	0.0 0.00 0.00 0.00 0	0.0 68.0
Total	-6.7				Rm Exh	0 0	0.72 0.00 -2.64 0.1 0.0	0.0 0.0
					Auxil	0 0		

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***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==>      Mo/Hr: 7/14      *      Mo/Hr: 7/16      *      Mo/Hr: 13/ 1
Outside Air ==>      QADB/WB/HR: 91/ 74/105.0      *      QADB: 91      *      QADB: 4
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-----HEATING COIL SELECTION-----					-----AIRFLOWS (cfm)-----			--ENGINEERING CHECKS--		--TEMPERATURES (F)---		
	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	30.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent	8,357	0	Clg Cfm/Sqft	1.03	SADB	66.4	75.6
Main Htg	-437.5	27,856	61.1	75.6	Infil	968	968	Clg Cfm/Ton	458.93	Plenum	75.4	66.9
Aux Htg	0.0	0	0.0	0.0	Supply	27,856	27,856	Clg Sqft/Ton	446.82	Return	76.1	67.9
Preheat	-385.1	27,856	48.4	61.1	Mincfm	0	0	Clg Btuh/Sqft	26.86	Ret/OA	80.4	67.9
Reheat	0.0	0	0.0	0.0	Return	27,856	27,856	No. People	65	Runarnd	75.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	8,357	0	Htg % OA	0.0	Fn MtrTD	1.3	1.3
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/SqFt	1.03	Fn BldTD	1.0	1.0
Total	-822.6				Auxil	0	0	Htg Btuh/SqFt	-30.33	Fn Frict	2.9	2.9

System 6 Block DD - DOUBLE DUCT

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Percent		Space	Percent		Space Peak	Coil Peak	Percent
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	14,486	0		14,486	1.99	*	16,221	6.19	*	-48,286	-48,286	21.28
Glass Solar	17,909	0		17,909	2.46	*	16,285	6.22	*	0	0	0.00
Glass Cond	4,840	0		4,840	0.66	*	5,167	1.97	*	-24,690	-24,690	10.88
Wall Cond	4,161	526		4,687	0.64	*	5,622	2.15	*	-16,677	-18,921	8.34
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	32,290			32,290	4.43	*	16,324	6.23	*	-67,403	-67,403	29.70
Sub Total==>	73,686	526		74,213	10.19	*	59,619	22.76	*	-157,056	-159,300	70.19
Internal Loads						*			*			
Lights	171,180	0		171,180	23.50	*	180,521	68.92	*	0	0	0.00
People	30,203			30,203	4.15	*	14,612	5.58	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	201,383	0	0	201,383	27.65	*	195,133	74.50	*	0	0	0.00
Ceiling Load	1,375	-1,375		0	0.00	*	1,553	0.59	*	-4,627	0	0.00
Outside Air	0	0	0	278,822	38.28	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				158,470	21.76	*		0.00	*		0	0.00
Ret. Fan Heat		19,809		19,809	2.72	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	5,616			5,616	0.77	*	5,616	2.14	*	-67,648	-67,648	29.81
Exhaust Heat		-9,934	0	-9,934	-1.36	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	-0.00	*		0.00	*		0	0.00
Grand Total==>	282,060	9,026	0	728,377	100.00	*	261,921	100.00	*	-229,331	-226,948	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	60.7	728.4	558.1	27,856 80.4 68.5 88.1	61.1 60.7 80.8	27,121		
Aux Clg	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Opt Vent	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	60.7	728.4				8,563	0	0
						1,613	460	29

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	30.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F								
Main Htg	-245.5	27,856	67.5	75.6	Vent	8,357	0	Clg Cfm/Sqft	1.03	SADB	66.4	75.6
Aux Htg	0.0	0	0.0	0.0	Infil	968	968	Clg Cfm/Ton	458.93	Plenum	75.4	66.5
Preheat	-385.1	27,856	48.4	61.1	Supply	27,856	27,856	Clg Sqft/Ton	446.82	Return	76.1	67.5
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	26.86	Ret/OA	80.4	67.5
Humidif	0.0	0	0.0	0.0	Return	27,856	27,856	No. People	65	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	8,357	0	Htg % OA	0.0	Fn MtrTD	1.3	1.3
Total	-630.6				Rm Exh	0	0	Htg Cfm/Sqft	1.03	Fn BldTD	1.0	1.0
					Auxil	0	0	Htg Btuh/Sqft	-23.25	Fn Frict	2.9	2.9

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

BUILDING U-VALUES - ALTERNATIVE 1
REPLACE FLUORESCENT LAMPS

----- B U I L D I N G U - V A L U E S -----												
Room Number	Description	Part.	ExFlr	Room U-Values (Btu/hr/sqft/F)						Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)	
				Summr Skylt	Wintr Skylt	Summr Roof	Wintr Windo	Windo	Wall			Ceil.
1	SUB BSMT, BSMT W	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
Zone	1 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
4	BSMT E	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
Zone	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
System	1 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.4	9.54
2	TOILETS, KITCHEN	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	29.4	5.93
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	29.4	5.93
11	TOILETS W ROOF	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
Zone	11 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	35.3	7.23
3	STAIRS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.229	0.000	103.3	21.63
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.229	0.000	103.3	21.63
5	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	57.9	12.05
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	57.9	12.05
7	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	56.7	11.81
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	56.7	11.81
9	3RD FL OFFICES	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	102.3	21.84
Zone	9 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	102.3	21.84
12	STAIRS W ROOF	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.229	0.000	146.4	31.13
Zone	12 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.229	0.000	146.4	31.13
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.256	0.317	74.1	15.63
13	SUPPLY STORAGE	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
Zone	13 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
System	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
6	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
8	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
10	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
Zone	10 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
System	5 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	43.1	8.94
14	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
Zone	14 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
15	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
Zone	15 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
16	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
Zone	16 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
System	6 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	43.1	8.94
Building		0.229	0.000	0.000	0.000	0.088	0.810	0.837	0.256	0.317	52.6	10.93

BUILDING AREAS - ALTERNATIVE 1
REPLACE FLUORESCENT LAMPS

----- B U I L D I N G A R E A S -----

Room Number	Description	Number of Duplicate Flr Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skf /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	SUB BSMT, BSMT W	1	1	45,125	45,125	13,222	0	0	0	0	0	0
Zone	1 Total/Ave.			45,125	13,222	0	0	0	0	0	0	0
4	BSMT E	1	1	12,424	12,424	3,348	0	0	0	0	0	0
Zone	4 Total/Ave.			12,424	3,348	0	0	0	0	0	0	0
System	1 Total/Ave.			57,549	16,570	0	0	0	0	0	0	0
2	TOILETS, KITCHEN	1	1	3,520	3,520	0	0	0	0	21	11	174
Zone	2 Total/Ave.			3,520	0	0	0	0	0	21	11	174
11	TOILETS W ROOF	1	1	580	580	0	0	0	580	0	0	0
Zone	11 Total/Ave.			580	0	0	0	0	580	0	0	0
System	2 Total/Ave.			4,100	0	0	0	0	580	21	11	174
3	STAIRS	1	1	560	560	0	0	0	0	255	29	625
Zone	3 Total/Ave.			560	0	0	0	0	0	255	29	625
5	1ST FL OFFICES	1	1	11,724	11,724	0	0	0	0	1,573	19	6,530
Zone	5 Total/Ave.			11,724	0	0	0	0	0	1,573	19	6,530
7	2ND FL OFFICES	1	1	14,400	14,400	0	0	0	0	1,610	17	7,730
Zone	7 Total/Ave.			14,400	0	0	0	0	0	1,610	17	7,730
9	3RD FL OFFICES	1	1	14,400	14,400	0	0	0	14,400	1,610	17	8,010
Zone	9 Total/Ave.			14,400	0	0	0	0	14,400	1,610	17	8,010
12	STAIRS W ROOF	1	1	280	280	0	0	0	280	105	25	307
Zone	12 Total/Ave.			280	0	0	0	0	280	105	25	307
System	3 Total/Ave.			41,364	0	0	0	0	14,680	5,152	18	23,202
13	SUPPLY STORAGE	1	1	2,544	2,544	1,632	0	0	0	0	0	0
Zone	13 Total/Ave.			2,544	1,632	0	0	0	0	0	0	0
System	4 Total/Ave.			2,544	1,632	0	0	0	0	0	0	0
6	1ST FL CEN OFFCS	1	1	9,884	9,884	0	0	0	0	250	19	1,038
Zone	6 Total/Ave.			9,884	0	0	0	0	0	250	19	1,038
8	2ND FL CEN OFFCS	1	1	8,674	8,674	0	0	0	0	105	66	55
Zone	8 Total/Ave.			8,674	0	0	0	0	0	105	66	55
10	3RD FL CEN OFFCS	1	1	8,563	8,563	0	0	0	8,563	105	64	60
Zone	10 Total/Ave.			8,563	0	0	0	0	8,563	105	64	60
System	5 Total/Ave.			27,121	0	0	0	0	8,563	460	29	1,153
14	1ST FL CEN OFFCS	1	1	9,884	9,884	0	0	0	0	250	19	1,038
Zone	14 Total/Ave.			9,884	0	0	0	0	0	250	19	1,038
15	2ND FL CEN OFFCS	1	1	8,674	8,674	0	0	0	0	105	66	55
Zone	15 Total/Ave.			8,674	0	0	0	0	0	105	66	55
16	3RD FL CEN OFFCS	1	1	8,563	8,563	0	0	0	8,563	105	64	60
Zone	16 Total/Ave.			8,563	0	0	0	0	8,563	105	64	60
System	6 Total/Ave.			27,121	0	0	0	0	8,563	460	29	1,153
Building				159,799	18,202	0	0	0	32,386	6,095	19	25,681

ASHRAE 90 ANALYSIS - ALTERNATIVE 1
REPLACE FLUORESCENT LAMPS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.088 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.362 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.224 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTT_{Vr}) = 3.96 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTT_{Vw}) = 24.46 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1
REPLACE FLUORESCENT LAMPS

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	17.4	0	0	-204,112	17	229	6,544.3	0	0	0.0	0	0
5 - 10	34.9	1	12	-408,224	6	82	13,088.7	0	0	0.0	0	0
10 - 15	52.3	11	122	-612,336	5	72	19,633.1	0	0	0.0	0	0
15 - 20	69.7	8	88	-816,448	6	73	26,177.4	0	0	0.0	0	0
20 - 25	87.2	8	87	-1,020,560	2	31	32,721.7	0	0	0.0	0	0
25 - 30	104.6	9	91	-1,224,672	7	87	39,266.1	0	0	0.0	0	0
30 - 35	122.0	18	191	-1,428,784	8	102	45,810.5	0	0	0.0	0	0
35 - 40	139.5	9	99	-1,632,896	26	344	52,354.8	0	0	0.0	0	0
40 - 45	156.9	6	67	-1,837,009	14	182	58,899.2	0	0	0.0	0	0
45 - 50	174.3	3	27	-2,041,121	9	114	65,443.5	0	0	0.0	0	0
50 - 55	191.8	4	44	-2,245,233	0	0	71,987.9	0	0	0.0	0	0
55 - 60	209.2	4	42	-2,449,345	0	0	78,532.2	0	0	0.0	0	0
60 - 65	226.6	3	35	-2,653,457	0	0	85,076.6	0	0	0.0	0	0
65 - 70	244.1	9	95	-2,857,569	0	0	91,620.9	0	0	0.0	0	0
70 - 75	261.5	6	60	-3,061,681	0	0	98,165.3	0	0	0.0	0	0
75 - 80	278.9	1	10	-3,265,793	0	0	104,709.6	0	0	0.0	0	0
80 - 85	296.4	0	0	-3,469,905	0	0	111,254.0	0	0	0.0	0	0
85 - 90	313.8	0	0	-3,674,018	0	0	117,798.3	100	2,520	0.0	0	0
90 - 95	331.3	0	0	-3,878,130	0	0	124,342.7	0	0	0.0	0	0
95 - 100	348.7	0	0	-4,082,242	0	0	130,887.0	0	0	0.0	0	0
Hours Off	0.0	0	7,690	0	0	7,444	0.0	0	6,240	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1
REPLACE FLUORESCENT LAMPS

----- BUILDING TEMPERATURE PROFILES -----

Temperature Range (F)	----- Zone Number -----															
	1	4	2	11	3	5	7	9	12	13	6	8	10	14	15	16
Max. Temp.	81.3	80.3	189.2	117.0	86.4	85.0	84.7	83.2	85.3	94.4	85.0	87.5	84.4	85.0	87.5	84.4
Mo./Hr.	10 22	10 24	9 18	8 17	7 20	7 24	7 24	7 21	7 20	8 16	7 3 10	2 7 6	7 3 10	2 7 6	2 7 6	2 7 6
Day Type	2	2	2	2	4	1	1	4	4	2	5	2	5	5	2	5
..... Number of Hours																
Above 100	0	0	7,727	3,297	0	0	0	0	0	0	0	0	0	0	0	0
95 - 100	0	0	289	813	0	0	0	0	0	0	0	0	0	0	0	0
90 - 95	0	0	0	338	0	0	0	0	0	1,533	0	0	0	0	0	0
85 - 90	0	0	261	1,171	118	0	0	0	36	1,634	0	306	0	0	306	0
80 - 85	238	76	313	129	1,161	1,168	1,136	690	1,145	688	1,810	3,004	1,449	1,810	2,999	1,449
75 - 80	5,226	2,694	170	852	1,748	1,925	1,957	2,319	1,904	1,157	3,022	4,785	3,784	3,062	4,503	3,774
70 - 75	1,482	3,922	0	565	635	596	596	731	587	1,403	1,203	662	1,170	1,067	904	1,033
65 - 70	1,538	1,712	0	1,283	1,387	1,552	1,571	1,610	1,456	1,816	1,467	0	1,706	1,479	48	1,744
60 - 65	276	356	0	312	1,106	1,136	1,101	1,370	1,135	524	550	0	456	600	0	526
55 - 60	0	0	0	0	916	868	900	857	987	0	318	0	195	334	0	234
50 - 55	0	0	0	0	655	641	630	545	655	0	390	0	0	405	0	0
Below 50	0	0	0	0	1,034	874	869	638	855	0	0	0	0	3	0	0
Min. Temp.	62.9	62.1	68.0	62.0	34.0	34.6	34.6	37.3	35.5	61.1	50.2	67.8	57.3	50.0	67.8	57.1
Mo./Hr.	1 8	1 10	1 1	2 7	2 11	2 7	2 7	2 7	2 7	1 7	2 7	1 7	1 7	2 7	1 7	1 7
Day Type	5	5	1	5	4	5	5	5	5	5	5	1	5	5	1	5

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1
REPLACE FLUORESCENT LAMPS

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	STEAM On Peak (Therm)	WATER (1000 G1)	STEAM DMND On Peak (Thrm/hr)
Jan	155,374	771	12,323	0	72
Feb	140,577	771	11,801	0	72
March	169,595	771	9,001	0	68
April	142,010	771	2,412	0	48
May	182,073	901	0	66	0
June	188,324	962	0	108	0
July	187,009	1,016	0	183	0
Aug	198,135	970	0	120	0
Sept	165,886	924	0	62	0
Oct	154,686	771	1,462	0	47
Nov	144,710	771	4,799	0	62
Dec	147,976	771	10,498	0	72
Total	1,976,354	1,016	52,296	538	72

Building Energy Consumption = 74,937 (Btu/Sq Ft/Year)
Source Energy Consumption = 170,281 (Btu/Sq Ft/Year)

Floor Area = 159,799 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION

Ref	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	70929	64174	77685	67552	74307	74307	67552	77685	67552	74307	67552	67552	851,153
	PK	369.1	369.1	369.1	369.1	369.1	369.1	369.1	369.1	369.1	369.1	369.1	369.1	369.1
1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH2O	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1001S		2-STG CTV <555 TONS											
	ELEC	0	0	0	0	13021	19272	33325	21399	12203	0	0	0	99,220
	PK	0.0	0.0	0.0	0.0	100.8	162.4	216.2	170.3	123.9	0.0	0.0	0.0	216.2
1	EQ5100		COOLING TOWER											
	ELEC	0	0	0	0	5115	5115	4650	5348	4650	0	0	0	24,878
	PK	0.0	0.0	0.0	0.0	23.3	23.3	23.3	23.3	23.3	0.0	0.0	0.0	23.3
1	EQ5100		COOLING TOWER											
	WATER	0	0	0	0	66	108	183	120	62	0	0	0	538
	PK	0.0	0.0	0.0	0.0	0.6	0.9	1.1	0.9	0.7	0.0	0.0	0.0	1.1
1	EQ5001		CHILLED WATER PUMP C.V.											
	ELEC	0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
	PK	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5010		CONDENSER WATER PUMP C.V.											
	ELEC	0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
	PK	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5300		CONTROL PANEL & INTERLOCK											

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UTILITY PEAK CHECKSUMS - ALTERNATIVE 1
REPLACE FLUORESCENT LAMPS

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 1,016.0 (kW)
Yearly Time of Peak 14 (hr) 7 (mo)

Hour 14 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Percent Of Tot (%)
Cooling Equipment				
1	EQ1001S	2-STG CTV <555 TONS	300.1	29.54
Sub Total			300.1	29.54
Sub Total			0.0	0.00
Air Moving Equipment				
1		SUMMATION OF FAN ELECTRICAL DEMAND	57.3	5.64
3		SUMMATION OF FAN ELECTRICAL DEMAND	74.9	7.37
5		SUMMATION OF FAN ELECTRICAL DEMAND	107.3	10.56
6		SUMMATION OF FAN ELECTRICAL DEMAND	107.3	10.56
Sub Total			346.8	34.13
Sub Total			0.0	0.00
Miscellaneous				
Lights			369.1	36.33
Base Utilities			0.0	0.00
Misc Equipment			0.0	0.00
Sub Total			369.1	36.33
Grand Total			1,016.0	100.00

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**          TRACE 600 ANALYSIS          **
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**          by          **
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 122

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 72 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Relectance: 0.20
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 12: 6:50 2/ 2/94
Dataset Name: CB1228 .TM

AIRFLOW - ALTERNATIVE 2
REPLACE FLUORESCENT BALLASTS

----- S Y S T E M S U M M A R Y -----
(Design Airflow Quantities)

System Number	System Type	Main					Auxil.	Room
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	TRH	10,853	36,175	36,175	36,175	10,853	0	0
2	SZ	0	17,730	17,730	17,730	0	0	17,730
3	INDFP	5,830	19,435	19,435	36,448	19,435	34,201	0
4	UH	0	0	1,835	0	0	0	0
5	DD	8,357	27,856	27,856	28,824	27,856	0	0
6	DD	8,357	27,856	27,856	28,824	9,325	0	0
Totals		33,397	129,052	130,887	148,000	67,468	34,201	17,730

CAPACITY - ALTERNATIVE 2
REPLACE FLUORESCENT BALLASTS

----- S Y S T E M S U M M A R Y -----
(Design Capacity Quantities)

		Cooling					Heating					
		Main Sys.	Aux. Sys.	Opt. Vent	Cooling	Main Sys.	Aux. Sys.	Preheat	Reheat	Humidif.	Opt. Vent	Heating
System	System	Capacity	Capacity	Capacity	Totals	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity	Totals
Number	Type	(Tons)	(Tons)	(Tons)	(Tons)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)
	1 TRH	70.7	0.0	0.0	70.7	-68,182	0	-574,205	0	0	0	-642,386
	2 SZ	2.6	0.0	0.0	2.6	-9,837	0	-113,011	0	0	0	-9,837
	3 INDFP	46.4	96.0	0.0	142.4	-680,963	-1,230,942	0	0	0	0	-1,911,905
	4 UH	0.0	0.0	0.0	0.0	-6,715	0	0	0	0	0	-6,715
	5 DD	57.8	0.0	0.0	57.8	-363,404	0	-409,007	0	0	0	-772,411
	6 DD	57.8	0.0	0.0	57.8	-245,454	0	-409,007	0	0	0	-654,461
	Totals	235.3	96.0	0.0	331.3	-1,374,555	-1,230,942	-1,505,230	0	0	0	-3,997,717

The building peaked at hour 14 month 7 with a capacity of 235.3 tons

ENGINEERING CHECKS - ALTERNATIVE 2
REPLACE FLUORESCENT BALLASTS

----- ENGINEERING CHECKS -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	----- Cooling -----				--- Heating ---		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	TRH	30.00	0.63	511.9	814.3	14.74	0.63	-11.16	57,549
2	Main	SZ	0.00	4.32	6,826.6	1,578.6	7.60	4.32	-2.40	4,100
3	Main	INDFP	30.00	0.47	418.7	891.2	13.46	0.47	-16.46	41,364
3	Auxiliary	INDFP	0.00	0.83	356.2	430.8	27.86	0.83	-29.76	41,364
4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.72	-2.64	2,544
5	Main	DD	30.00	1.03	482.0	469.3	25.57	1.03	-28.48	27,121
6	Main	DD	30.00	1.03	482.0	469.3	25.57	1.03	-24.13	27,121

System 1 Peak TRH - TERMINAL REHEAT

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Percent		Space	Percent		Space Peak	Coil Peak	Percent
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Wall Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Partition	18,940			18,940	2.23	*	18,940	4.98	*	-68,182	-68,182	100.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	18,940	0		18,940	2.23	*	18,940	4.98	*	-68,182	-68,182	100.00
Internal Loads						*			*			
Lights	310,335	0		310,335	36.59	*	329,977	86.83	*	0	0	0.00
People	63,941			63,941	7.54	*	31,097	8.18	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	374,276	0	0	374,276	44.13	*	361,074	95.02	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	365,080	43.05	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				77,173	9.10	*		0.00	*		0	0.00
Ret. Fan Heat		18,007		18,007	2.12	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	-0.00	*	0	-0.00	*	0	0	0.00
Exhaust Heat		-5,402	0	-5,402	-0.64	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	393,216	12,605	0	848,074	100.00	*	380,013	100.00	*	-68,182	-68,182	100.00

-----COOLING COIL SELECTION-----

-----AREAS-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	70.7	848.1	36,175	80.0 68.3 87.8	63.4 61.3 80.2	57,549		
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	16,570		
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	70.7	848.1				0	0	0

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	30.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent	10,853	0	Clg Cfm/Sqft	0.63	SADB	65.3	69.7
Main Htg	-68.2	36,175	68.0	69.7	Infil	0	0	Clg Cfm/Ton	511.87	Plenum	75.0	68.0
Aux Htg	0.0	0	0.0	0.0	Supply	36,175	36,175	Clg Sqft/Ton	814.30	Return	75.5	68.0
Preheat	-574.2	36,175	48.8	63.4	Mincfm	36,175	0	Clg Btuh/Sqft	14.74	Ret/OA	80.0	68.0
Reheat	-0.0	0	0.0	0.0	Return	36,175	36,175	No. People	137	Runarnd	75.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	10,853	0	Htg % OA	0.0	Fn MtrTD	0.5	0.5
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	0.63	Fn BldTD	0.4	0.4
Total	-642.4				Auxil	0	0	Htg Btuh/Sqft	-11.16	Fn Frict	1.1	1.1

System 2 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/16 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	860		860	2.76	*	0	0.00	*	0	-3,224	44.57
Glass Solar	595	0		595	1.91	*	595	2.12	*	0	0	0.00
Glass Cond	239	0		239	0.77	*	239	0.85	*	-1,139	-1,139	15.75
Wall Cond	747	183		929	2.98	*	747	2.66	*	-2,286	-2,870	39.68
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	1,581	1,042		2,623	8.42	*	1,581	5.63	*	-3,426	-7,234	100.00
Internal Loads						*			*			
Lights	23,831	0		23,831	76.46	*	23,831	84.86	*	0	0	0.00
People	4,712			4,712	15.12	*	2,223	7.92	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	28,543	0	0	28,543	91.58	*	26,054	92.78	*	0	0	0.00
Ceiling Load	1,918	-1,918		0	0.00	*	447	1.59	*	-243	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	-0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	32,042	-876	0	31,166	100.00	*	28,081	100.00	*	-3,668	-7,234	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	2.6	31.2	28.7	17,730 76.6 69.0 97.5	73.5 68.6 99.8	4,100		
Aux Clg	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Opt Vent	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	2.6	31.2				580	0	0
						196	21	11

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent			Clg Cfm/Sqft	4.32	SADB	73.5	68.2
Main Htg	-9.8	17,730	67.7	68.2	Infil	0	0	Clg Cfm/Ton	6826.64	Plenum	76.5	67.7
Aux Htg	0.0	0	0.0	0.0	Supply	17,730	17,730	Clg Sqft/Ton	1578.64	Return	79.7	67.7
Preheat	-113.0	17,730	67.7	73.5	Mincfm	0	0	Clg Btuh/Sqft	7.60	Ret/OA	76.6	67.7
Reheat	0.0	0	0.0	0.0	Return	0	17,730	No. People	10	Runarnd	75.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	17,730	0	Htg Cfm/Sqft	4.32	Fn BldTD	0.0	0.0
Total	-9.8				Auxil	0	0	Htg Btuh/Sqft	-2.40	Fn Frict	0.0	0.0

System 3 Block INDFP - 4-PIPE INDUCTION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/19 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 85 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	474	21,484		21,957	1.26	*	664	0.10	*	-1,579	-73,446	3.84
Glass Solar	171,927	0		171,927	9.87	*	185,822	28.25	*	0	0	0.00
Glass Cond	53,830	0		53,830	3.09	*	40,082	6.09	*	-276,287	-276,287	14.45
Wall Cond	113,330	16,902		130,232	7.48	*	168,977	25.69	*	-328,407	-377,319	19.74
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	736,354			736,354	42.29	*	170,578	25.93	*	-1,184,852	-1,184,852	61.97
Sub Total==>	1,075,915	38,386		1,114,301	64.00	*	566,123	86.06	*	-1,791,125	-1,911,905	100.00
Internal Loads												
Lights	216,053	0		216,053	12.41	*	62,058	9.43	*	0	0	0.00
People	45,248			45,248	2.60	*	6,070	0.92	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	261,301	0	0	261,301	15.01	*	68,127	10.36	*	0	0	0.00
Ceiling Load	14,654	-14,654		0	0.00	*	23,486	3.57	*	-47,811	0	0.00
Outside Air	0	0	0	252,361	14.49	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				110,564	6.35	*		0.00	*		0	0.00
Ret. Fan Heat		13,820		13,820	0.79	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	119			119	0.01	*	119	0.02	*	0	0	0.00
Exhaust Heat		-11,266	0	-11,266	-0.65	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	1,351,989	26,287	0	1,741,200	100.00	*	657,856	100.00	*	-1,838,936	-1,911,905	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	46.4	557.0	19,435	80.9 66.7 78.0	59.9 57.7 69.7	Part	41,364	
Aux Clg	96.0	1,152.3	34,201	75.0 64.3 75.7	65.1 53.1 42.6	ExFlr	0	
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Roof	14,680	0 0
Totals	142.4	1,709.3				Wall	28,354	5,152 18

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	30.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent	5,830	0	Clg Cfm/Sqft	0.47	SADB	65.1	96.7
Main Htg	-681.0	19,435	64.5	96.7	Infil	17,013	17,013	Clg Cfm/Ton	418.73	Plenum	76.1	64.4
Aux Htg	-1,230.9	34,201	68.0	101.1	Supply	19,435	19,435	Clg Sqft/Ton	891.20	Return	76.8	64.5
Preheat	-0.0	19,435	64.5	59.9	Mincfm	0	0	Clg Btuh/Sqft	13.46	Ret/OA	80.9	64.5
Reheat	0.0	0	0.0	0.0	Return	19,435	19,435	No. People	98	Runarnd	75.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	5,830	0	Htg % OA	0.0	Fn MtrTD	1.3	1.3
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	0.47	Fn BldTD	1.0	1.0
Total	-1,911.9				Auxil	34,201	34,201	Htg Btuh/Sqft	-16.46	Fn Frict	2.9	2.9

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 4 Block UH - UNIT HEATERS

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Wall Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Partition	0			0	0.00	*	0	0.00	*	-6,715	-6,715	100.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-6,715	-6,715	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-6,715	-6,715	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Part	2,544	
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Exflr	1,632	
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Roof	0	0 0
Totals	0.0	0.0				Wall	0	0 0

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent			Clg Cfm/Sqft	0.00	SADB	0.0	71.4
Main Htg	-6.7	1,835	68.0	71.4	Infil	0	0	Clg Cfm/Ton	0.00	Plenum	0.0	68.0
Aux Htg	0.0	0	0.0	0.0	Supply	0	1,835	Clg Sqft/Ton	0.00	Return	0.0	68.0
Preheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/DA	0.0	68.0
Reheat	0.0	0	0.0	0.0	Return	0	1,835	No. People	0	Runarnd	0.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	0.72	Fn BldTD	0.0	0.0
Total	-6.7				Auxil	0	0	Htg Btuh/Sqft	-2.64	Fn Frict	0.1	0.0

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 5 Block DD - DOUBLE DUCT

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	14,486	0		14,486	2.09	*	16,221	6.82	*	-48,286	-48,286	21.28
Glass Solar	17,909	0		17,909	2.58	*	16,285	6.84	*	0	0	0.00
Glass Cond	4,840	0		4,840	0.70	*	5,167	2.17	*	-24,690	-24,690	10.88
Wall Cond	4,161	526		4,687	0.68	*	5,622	2.36	*	-16,677	-18,921	8.34
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	31,019			31,019	4.47	*	16,324	6.86	*	-67,403	-67,403	29.70
Sub Total==>	72,415	526		72,941	10.52	*	59,619	25.05	*	-157,056	-159,300	70.19
Internal Loads												
Lights	148,208	0		148,208	21.37	*	156,295	65.67	*	0	0	0.00
People	30,203			30,203	4.36	*	14,612	6.14	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	178,410	0	0	178,410	25.73	*	170,907	71.80	*	0	0	0.00
Ceiling Load	1,375	-1,375		0	0.00	*	1,553	0.65	*	-4,627	0	0.00
Outside Air	0	0	0	267,845	38.62	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				158,470	22.85	*		0.00	*		0	0.00
Ret. Fan Heat		19,809		19,809	2.86	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	5,938			5,938	0.86	*	5,938	2.49	*	-67,648	-67,648	29.81
Exhaust Heat		-9,934	0	-9,934	-1.43	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	-0.00	*		0.00	*		0	0.00
Grand Total==>	258,138	9,026	0	693,479	100.00	*	238,017	100.00	*	-229,331	-226,948	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	57.8	693.5	27,856	80.4 68.7 89.5	61.9 61.4 82.7	Part	27,121	
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	0	
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Roof	8,563	0 0
Totals	57.8	693.5				Wall	1,613	460 29

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	30.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent			Clg Cfm/Sqft	1.03	SADB	67.1	75.6
Main Htg	-363.4	27,856	63.6	75.6	Infil	968	968	Clg Cfm/Ton	482.02	Plenum	75.4	66.5
Aux Htg	0.0	0	0.0	0.0	Supply	27,856	27,856	Clg Sqft/Ton	469.30	Return	76.1	67.5
Preheat	-409.0	27,856	48.4	61.9	Mincfm	0	0	Clg Btuh/Sqft	25.57	Ret/OA	80.4	67.5
Reheat	0.0	0	0.0	0.0	Return	27,856	27,856	No. People	65	Runarnd	75.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	8,357	0	Htg % OA	0.0	Fn MtrTD	1.3	1.3
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	1.03	Fn BldTD	1.0	1.0
Total	-772.4				Auxil	0	0	Htg Btuh/Sqft	-28.48	Fn Frict	2.9	2.9

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 6 Block DD - DOUBLE DUCT

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	14,486	0		14,486	2.09	*	16,221	6.82	*	-48,286	-48,286	21.28
Glass Solar	17,909	0		17,909	2.58	*	16,285	6.84	*	0	0	0.00
Glass Cond	4,840	0		4,840	0.70	*	5,167	2.17	*	-24,690	-24,690	10.88
Wall Cond	4,161	526		4,687	0.68	*	5,622	2.36	*	-16,677	-18,921	8.34
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	31,019			31,019	4.47	*	16,324	6.86	*	-67,403	-67,403	29.70
Sub Total==>	72,415	526		72,941	10.52	*	59,619	25.05	*	-157,056	-159,300	70.19
Internal Loads						*			*			
Lights	148,208	0		148,208	21.37	*	156,295	65.67	*	0	0	0.00
People	30,203			30,203	4.36	*	14,612	6.14	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	178,410	0	0	178,410	25.73	*	170,907	71.80	*	0	0	0.00
Ceiling Load	1,375	-1,375		0	0.00	*	1,553	0.65	*	-4,627	0	0.00
Outside Air	0	0	0	267,845	38.62	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				158,470	22.85	*		0.00	*		0	0.00
Ret. Fan Heat		19,809		19,809	2.86	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	5,938			5,938	0.86	*	5,938	2.49	*	-67,648	-67,648	29.81
Exhaust Heat		-9,934	0	-9,934	-1.43	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	-0.00	*		0.00	*		0	0.00
Grand Total==>	258,138	9,026	0	693,479	100.00	*	232,017	100.00	*	-229,331	-226,948	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	57.8	693.5	535.4	27,856 80.4 68.7 89.5	61.9 61.4 82.7	27,121		
Aux Clg	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Opt Vent	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	57.8	693.5				8,563	0	0
						1,613	460	29

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	30.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent	8,357	0	Clg Cfm/Sqft	1.03	SADB	67.1	75.6
Main Htg	-245.5	27,856	67.5	75.6	Infil	968	968	Clg Cfm/Ton	482.02	Plenum	75.4	66.5
Aux Htg	0.0	0	0.0	0.0	Supply	27,856	27,856	Clg Sqft/Ton	469.30	Return	76.1	67.5
Preheat	-409.0	27,856	48.4	61.9	Mincfm	0	0	Clg Btuh/Sqft	25.57	Ret/OA	80.4	67.5
Reheat	0.0	0	0.0	0.0	Return	27,856	27,856	No. People	65	Runarnd	75.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	8,357	0	Htg % OA	0.0	Fn MtrTD	1.3	1.3
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	1.03	Fn BldTD	1.0	1.0
Total	-654.5				Auxil	0	0	Htg Btuh/Sqft	-24.13	Fn Frict	2.9	2.9

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

BUILDING U-VALUES - ALTERNATIVE 2
REPLACE FLUORESCENT BALLASTS

----- B U I L D I N G U - V A L U E S -----

Room Number	Description	Part.	ExFlr	Room U-Values (Btu/hr/sqft/F)							Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
				Summr Skylt	Wintr Skylt	Summr Roof	Wintr Windo	Wintr Windo	Wall	Ceil.		
1	SUB BSMT, BSMT W	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
Zone	1 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
4	BSMT E	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
Zone	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
System	1 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.4	9.54
2	TOILETS, KITCHEN	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	29.4	5.93
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	29.4	5.93
11	TOILETS W ROOF	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
Zone	11 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	35.3	7.23
3	STAIRS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.229	0.000	103.3	21.63
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.229	0.000	103.3	21.63
5	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	57.9	12.05
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	57.9	12.05
7	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	56.7	11.81
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	56.7	11.81
9	3RD FL OFFICES	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	102.3	21.84
Zone	9 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	102.3	21.84
12	STAIRS W ROOF	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.229	0.000	146.4	31.13
Zone	12 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.229	0.000	146.4	31.13
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.256	0.317	74.1	15.63
13	SUPPLY STORAGE	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
Zone	13 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
System	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
6	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
8	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
10	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
Zone	10 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
System	5 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	43.1	8.94
14	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
Zone	14 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
15	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
Zone	15 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
16	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
Zone	16 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
System	6 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	43.1	8.94
Building		0.229	0.000	0.000	0.000	0.088	0.810	0.837	0.256	0.317	52.6	10.93

BUILDING AREAS - ALTERNATIVE 2
REPLACE FLUORESCENT BALLASTS

B U I L D I N G A R E A S													
Room Number	Description	Number of Duplicate Flr Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)	
1	SUB BSMT, BSMT W	1 1	45,125	45,125	13,222	0	0	0	0	0	0	0	
Zone	1 Total/Ave.			45,125	13,222	0	0	0	0	0	0	0	
4	BSMT E	1 1	12,424	12,424	3,348	0	0	0	0	0	0	0	
Zone	4 Total/Ave.			12,424	3,348	0	0	0	0	0	0	0	
System	1 Total/Ave.			57,549	16,570	0	0	0	0	0	0	0	
2	TOILETS, KITCHEN	1 1	3,520	3,520	0	0	0	0	0	21	11	174	
Zone	2 Total/Ave.			3,520	0	0	0	0	0	21	11	174	
11	TOILETS W ROOF	1 1	580	580	0	0	0	0	580	0	0	0	
Zone	11 Total/Ave.			580	0	0	0	0	580	0	0	0	
System	2 Total/Ave.			4,100	0	0	0	0	580	21	11	174	
3	STAIRS	1 1	560	560	0	0	0	0	0	255	29	625	
Zone	3 Total/Ave.			560	0	0	0	0	0	255	29	625	
5	1ST FL OFFICES	1 1	11,724	11,724	0	0	0	0	0	1,573	19	6,530	
Zone	5 Total/Ave.			11,724	0	0	0	0	0	1,573	19	6,530	
7	2ND FL OFFICES	1 1	14,400	14,400	0	0	0	0	0	1,610	17	7,730	
Zone	7 Total/Ave.			14,400	0	0	0	0	0	1,610	17	7,730	
9	3RD FL OFFICES	1 1	14,400	14,400	0	0	0	0	14,400	1,610	17	8,010	
Zone	9 Total/Ave.			14,400	0	0	0	0	14,400	1,610	17	8,010	
12	STAIRS W ROOF	1 1	280	280	0	0	0	0	280	105	25	307	
Zone	12 Total/Ave.			280	0	0	0	0	280	105	25	307	
System	3 Total/Ave.			41,364	0	0	0	0	14,680	5,152	18	23,202	
13	SUPPLY STORAGE	1 1	2,544	2,544	1,632	0	0	0	0	0	0	0	
Zone	13 Total/Ave.			2,544	1,632	0	0	0	0	0	0	0	
System	4 Total/Ave.			2,544	1,632	0	0	0	0	0	0	0	
6	1ST FL CEN OFFCS	1 1	9,884	9,884	0	0	0	0	0	250	19	1,038	
Zone	6 Total/Ave.			9,884	0	0	0	0	0	250	19	1,038	
8	2ND FL CEN OFFCS	1 1	8,674	8,674	0	0	0	0	0	105	66	55	
Zone	8 Total/Ave.			8,674	0	0	0	0	0	105	66	55	
10	3RD FL CEN OFFCS	1 1	8,563	8,563	0	0	0	0	8,563	105	64	60	
Zone	10 Total/Ave.			8,563	0	0	0	0	8,563	105	64	60	
System	5 Total/Ave.			27,121	0	0	0	0	8,563	460	29	1,153	
14	1ST FL CEN OFFCS	1 1	9,884	9,884	0	0	0	0	0	250	19	1,038	
Zone	14 Total/Ave.			9,884	0	0	0	0	0	250	19	1,038	
15	2ND FL CEN OFFCS	1 1	8,674	8,674	0	0	0	0	0	105	66	55	
Zone	15 Total/Ave.			8,674	0	0	0	0	0	105	66	55	
16	3RD FL CEN OFFCS	1 1	8,563	8,563	0	0	0	0	8,563	105	64	60	
Zone	16 Total/Ave.			8,563	0	0	0	0	8,563	105	64	60	
System	6 Total/Ave.			27,121	0	0	0	0	8,563	460	29	1,153	
Building				159,799	18,202	0	0	0	32,386	6,095	19	25,681	

ASHRAE 90 ANALYSIS - ALTERNATIVE 2
REPLACE FLUORESCENT BALLASTS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.088 (Btu/Hr/Sq Ft/F)
Overall Wall U-Value = 0.362 (Btu/Hr/Sq Ft/F)
Overall Building U-Value = 0.224 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.96 (Btu/Hr/Sq Ft)
Wall Overall Thermal Transfer Value (OTTVw) = 24.46 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2
REPLACE FLUORESCENT BALLASTS

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	16.6	0	0	-205,536	19	257	6,544.3	0	0	0.0	0	0
5 - 10	33.1	1	16	-411,073	2	30	13,088.7	0	0	0.0	0	0
10 - 15	49.7	14	152	-616,609	5	69	19,633.1	0	0	0.0	0	0
15 - 20	66.3	7	80	-822,146	5	69	26,177.4	0	0	0.0	0	0
20 - 25	82.8	12	124	-1,027,682	4	48	32,721.7	0	0	0.0	0	0
25 - 30	99.4	6	68	-1,233,218	7	90	39,266.1	0	0	0.0	0	0
30 - 35	116.0	20	218	-1,438,755	9	118	45,810.5	0	0	0.0	0	0
35 - 40	132.5	5	50	-1,644,291	22	287	52,354.8	0	0	0.0	0	0
40 - 45	149.1	5	49	-1,849,828	16	207	58,899.2	0	0	0.0	0	0
45 - 50	165.6	3	27	-2,055,364	11	150	65,443.5	0	0	0.0	0	0
50 - 55	182.2	8	82	-2,260,901	0	0	71,987.9	0	0	0.0	0	0
55 - 60	198.8	2	19	-2,466,437	0	0	78,532.2	0	0	0.0	0	0
60 - 65	215.3	6	65	-2,671,974	0	0	85,076.6	0	0	0.0	0	0
65 - 70	231.9	7	75	-2,877,510	0	0	91,620.9	0	0	0.0	0	0
70 - 75	248.5	3	35	-3,083,046	0	0	98,165.3	0	0	0.0	0	0
75 - 80	265.0	1	10	-3,288,583	0	0	104,709.6	0	0	0.0	0	0
80 - 85	281.6	0	0	-3,494,119	0	0	111,254.0	0	0	0.0	0	0
85 - 90	298.2	0	0	-3,699,656	0	0	117,798.3	100	2,520	0.0	0	0
90 - 95	314.7	0	0	-3,905,192	0	0	124,342.7	0	0	0.0	0	0
95 - 100	331.3	0	0	-4,110,729	0	0	130,887.0	0	0	0.0	0	0
Hours Off	0.0	0	7,690	0	0	7,435	0.0	0	6,240	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2
REPLACE FLUORESCENT BALLASTS

----- B U I L D I N G T E M P E R A T U R E P R O F I L E S -----																
Temperature Range (F)	----- Zone Number -----															
	1	4	2	11	3	5	7	9	12	13	6	8	10	14	15	16
Max. Temp.	79.7	78.8	175.2	113.1	86.4	84.8	84.5	83.2	85.3	92.4	84.8	86.2	84.3	84.8	86.2	84.3
Mo./Hr.	10 21	10 24	9 19	8 16	7 20	7 23	7 24	7 21	7 20	8 17	7 2 10	1 7 6	7 2 10	1 7 6		
Day Type	2	2	2	2	4	1	1	4	4	2	5	2	5	5	2	5
..... Number of Hours																
Above 100	0	0	7,408	2,729	0	0	0	0	0	0	0	0	0	0	0	0
95 - 100	0	0	280	1,294	0	0	0	0	0	0	0	0	0	0	0	0
90 - 95	0	0	328	119	0	0	0	0	0	744	0	0	0	0	0	0
85 - 90	0	0	24	1,050	118	0	0	0	36	1,581	0	102	0	0	102	0
80 - 85	0	0	370	462	1,137	1,163	1,128	645	1,141	1,171	1,591	2,544	1,146	1,591	2,507	1,146
75 - 80	4,707	2,139	350	464	1,764	1,899	1,908	2,297	1,868	1,340	2,913	5,099	3,607	2,957	4,733	3,570
70 - 75	1,731	3,820	0	516	643	627	636	781	627	1,386	1,131	991	1,204	1,047	1,313	1,084
65 - 70	1,881	2,084	0	1,646	1,352	1,530	1,548	1,586	1,437	1,580	1,730	24	1,989	1,656	105	2,082
60 - 65	441	717	0	480	1,105	1,070	1,064	1,365	1,117	958	629	0	537	729	0	567
55 - 60	0	0	0	0	932	925	952	864	1,008	0	331	0	277	331	0	311
50 - 55	0	0	0	0	671	664	651	569	663	0	429	0	0	436	0	0
Below 50	0	0	0	0	1,038	882	873	653	863	0	6	0	0	13	0	0
Min. Temp.	62.3	61.1	67.9	60.1	34.0	34.5	34.5	37.1	35.5	60.4	49.8	67.7	56.9	49.6	66.8	56.8
Mo./Hr.	1 9	2 11	1 7	2 7	2 11	2 7	2 7	2 7	2 7	1 7	2 7	1 7	1 7	2 7	2 10	1 7
Day Type	5	5	1	5	4	5	5	5	5	5	5	1	5	5	5	5

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2
REPLACE FLUORESCENT BALLASTS

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC Off Peak (kWh)	DEMAND On Peak (kW)	STEAM On Peak (Thrm)	WATER (1000 G1)	STEAM DMND On Peak (Thrm/hr)
Jan	145,856	722	12,754	0	69
Feb	131,965	722	12,060	0	69
March	158,118	722	9,487	0	69
April	133,044	722	2,677	0	49
May	171,211	844	0	59	0
June	176,857	903	0	98	0
July	175,648	954	0	170	0
Aug	186,059	910	0	109	0
Sept	156,023	869	0	56	0
Oct	146,080	722	1,735	0	47
Nov	136,166	722	5,197	0	63
Dec	138,910	722	10,791	0	69
Total	1,855,935	954	54,701	492	69

Building Energy Consumption = 73,870 (8tu/Sq Ft/Year)
Source Energy Consumption = 164,571 (8tu/Sq Ft/Year)

Floor Area = 159,799 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION

Ref Num	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	61411	55562	67259	58486	64335	64335	58486	67259	58486	64335	58486	58486	736,929
	PK	319.6	319.6	319.6	319.6	319.6	319.6	319.6	319.6	319.6	319.6	319.6	319.6	319.6
1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTW20	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1001S		2-STG CTV <555 TONS											
	ELEC	0	0	0	0	12131	17777	31029	19748	11405	0	0	0	92,089
	PK	0.0	0.0	0.0	0.0	93.5	152.5	204.2	159.8	118.3	0.0	0.0	0.0	204.2
1	EQ5100		COOLING TOWER											
	ELEC	0	0	0	0	5115	5115	4650	5348	4650	0	0	0	24,878
	PK	0.0	0.0	0.0	0.0	23.3	23.3	23.3	23.3	23.3	0.0	0.0	0.0	23.3
1	EQ5100		COOLING TOWER											
	WATER	0	0	0	0	59	98	170	109	56	0	0	0	492
	PK	0.0	0.0	0.0	0.0	0.5	0.8	1.1	0.9	0.7	0.0	0.0	0.0	1.1
1	EQ5001		CHILLED WATER PUMP C.V.											
	ELEC	0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
	PK	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5010		CONDENSER WATER PUMP C.V.											
	ELEC	0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
	PK	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5300		CONTROL PANEL & INTERLOCK											

	ELEC	0	0	0	0	220	220	200	230	200	0	0	0	1,070
	PK	0.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0
2	EQ1000	PREVENTS COOLING ENERGY												
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5001	CHILLED WATER PUMP C.V.												
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5010	CONDENSER WATER PUMP C.V.												
	ELEC	0	0	0	0	-0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	9754	8825	10683	9290	10219	10219	9290	10583	9290	10219	9290	9290	117,051
	PK	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4
1	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	2276	2059	2493	2168	2384	2384	2168	2493	2168	2384	2168	2168	27,312
	PK	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
2	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	13975	12644	15305	13309	14640	14640	13309	15305	13309	14640	13309	13309	167,695
	PK	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5
3	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	1747	1580	1913	1664	1830	1830	1664	1913	1664	1830	1664	1664	20,962
	PK	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
5	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	20030	18122	21937	19076	20983	20983	19076	21937	19076	20983	19076	19076	240,355
	PK	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4
5	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	2504	2265	2742	2384	2623	2623	2384	2742	2384	2623	2384	2384	30,044
	PK	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9
6	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	20030	18122	21937	19076	20983	20983	19076	21937	19076	20983	19076	19076	240,355
	PK	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4
6	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	2504	2265	2742	2384	2623	2623	2384	2742	2384	2623	2384	2384	30,044
	PK	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9
1	EQ2101	PURCHASED DISTRICT STEAM												
	P STEAM	2186	2067	1626	441	0	0	0	0	0	297	881	1849	9,347
	PK	11.8	11.8	11.8	8.3	0.0	0.0	0.0	0.0	0.0	8.1	10.8	11.8	11.8
1	EQ5020	HEAT WATER CIRC. PUMP C.V.												

ELEC	6264	5667	5727	2267	0	0	0	0	0	2416	4057	5966	32,363
PK	29.8	29.8	29.8	29.8	0.0	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8

[illegible]

UTILITY PEAK CHECKSUMS - ALTERNATIVE 2
REPLACE FLUORESCENT BALLASTS

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 954.5 (kW)
Yearly Time of Peak 14 (hr) 7 (mo)

Hour 14 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Percent Of Tot (%)
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Cooling Equipment

1	EQ1001S	2-STG CTV <555 TONS	288.1	30.19
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Sub Total			288.1	30.19
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Sub Total			0.0	0.00
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Air Moving Equipment

1		SUMMATION OF FAN ELECTRICAL DEMAND	57.3	6.00
3		SUMMATION OF FAN ELECTRICAL DEMAND	74.9	7.84
5		SUMMATION OF FAN ELECTRICAL DEMAND	107.3	11.24
6		SUMMATION OF FAN ELECTRICAL DEMAND	107.3	11.24

Sub Total			346.8	36.33
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Sub Total			0.0	0.00
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Miscellaneous

Lights			319.6	33.48
Base Utilities			0.0	0.00
Misc Equipment			0.0	0.00
Sub Total			319.6	33.48

Grand Total			954.5	100.00
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**          TRACE    600    ANALYSIS          **
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**          by          **
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 122

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Relectance: 0.20
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 12:31: 9 2/ 2/94
Dataset Name: CB122B .TM

AIRFLOW - ALTERNATIVE 3
REPLACE FLUORESCENT FIXTURES

----- S Y S T E M S U M M A R Y -----
(Design Airflow Quantities)

System Number	System Type	----- Main -----					Auxil. Supply	Room Exhaust
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Airflow (Cfm)	Airflow (Cfm)
1	TRH	10,853	36,175	36,175	36,175	10,853	0	0
2	SZ	0	17,730	17,730	17,730	0	0	17,730
3	INDFP	5,830	19,435	19,435	36,448	19,435	32,434	0
4	UH	0	0	1,835	0	0	0	0
5	DD	8,357	27,856	27,856	28,824	27,856	0	0
6	DD	8,357	27,856	27,856	28,824	9,325	0	0
Totals		33,397	129,052	130,887	148,000	67,468	32,434	17,730

CAPACITY - ALTERNATIVE 3
REPLACE FLUORESCENT FIXTURES

----- S Y S T E M S U M M A R Y -----
(Design Capacity Quantities)

System Number	System Type	----- Cooling -----					----- Heating -----					
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	TRH	64.2	0.0	0.0	64.2	-68,182	0	-630,301	0	0	0	-698,484
2	SZ	2.3	0.0	0.0	2.3	-9,837	0	-117,003	0	0	0	-9,837
3	INDFP	46.4	88.4	0.0	134.8	-680,963	-1,230,942	0	0	0	0	-1,911,905
4	UH	0.0	0.0	0.0	0.0	-6,715	0	0	0	0	0	-6,715
5	DD	54.6	0.0	0.0	54.6	-245,454	0	-435,189	0	0	0	-680,644
6	DD	54.6	0.0	0.0	54.6	-245,454	0	-435,189	0	0	0	-680,644
Totals		222.0	88.4	0.0	310.4	-1,256,606	-1,230,942	-1,617,683	0	0	0	-3,988,228

The building peaked at hour 14 month 7 with a capacity of 222.0 tons

ENGINEERING CHECKS - ALTERNATIVE 3
REPLACE FLUORESCENT FIXTURES

----- ENGINEERING CHECKS -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	----- Cooling -----				--- Heating ---		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	TRH	30.00	0.63	563.3	896.2	13.39	0.63	-12.14	57,549
2	Main	SZ	0.00	4.32	7,846.6	1,814.5	6.61	4.32	-2.40	4,100
3	Main	INDFP	30.00	0.47	418.7	891.2	13.46	0.47	-16.46	41,364
3	Auxiliary	INDFP	0.00	0.78	367.0	468.0	25.64	0.78	-29.76	41,364
4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.72	-2.64	2,544
5	Main	DD	30.00	1.03	510.6	497.1	24.14	1.03	-25.10	27,121
6	Main	DD	30.00	1.03	510.6	497.1	24.14	1.03	-25.10	27,121

System 1 Peak TRH - TERMINAL REHEAT

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)		Space Sensible (Btuh)	Perct Of Tot (%)		Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Wall Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Partition	18,940			18,940	2.46	*	18,940	5.85	*	-68,182	-68,182	100.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	18,940	0		18,940	2.46	*	18,940	5.85	*	-68,182	-68,182	100.00
Internal Loads						*			*			
Lights	257,578	0		257,578	33.43	*	273,881	84.55	*	0	0	0.00
People	63,941			63,941	8.30	*	31,097	9.60	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	321,519	0	0	321,519	41.72	*	304,978	94.15	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	340,359	44.17	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				77,173	10.01	*		0.00	*		0	0.00
Ret. Fan Heat		18,007		18,007	2.34	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		-5,402	0	-5,402	-0.70	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	340,459	12,605	0	770,597	100.00	*	323,917	100.00	*	-68,182	-68,182	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total Floor	Glass (sf)	(%)
Main Clg	64.2	770.6	36,175	80.0 68.7 90.2	64.8 62.5 83.4	57,549		
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	16,570		
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	64.2	770.6				0	0	0

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling 10,853	Heating 0	Clg % OA 30.0	Type	Clg 66.8	Htg 69.7
Main Htg	-68.2	36,175	68.0	69.7	Vent	0	0	0.63	SAOB	75.0	68.0
Aux Htg	0.0	0	0.0	0.0	Infil	0	0	563.33	Plenum	75.5	68.0
Preheat	-630.3	36,175	48.8	64.8	Supply	36,175	36,175	896.17	Return	80.0	68.0
Reheat	-0.0	0	0.0	0.0	Minclm	36,175	0	13.39	Ret/OA	75.0	68.0
Humidif	0.0	0	0.0	0.0	Return	36,175	36,175	No. People	Runarnd	0.5	0.5
Opt Vent	0.0	0	0.0	0.0	Exhaust	10,853	0	0.0	Fn MtrTD	0.4	0.4
Total	-698.5				Rm Exh	0	0	0.63	Fn BldTD	1.1	1.1
					Auxil	0	0	-12.14	Fn Frict		

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 2 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/16 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 * OADB: 91 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Percent Of Tot (%)	*	Space Sensible (Btuh)	Percent Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Percent Of Tot (%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	860		860	3.17	*	0	0.00	*	0	-3,224	44.57
Glass Solar	595	0		595	2.19	*	595	2.47	*	0	0	0.00
Glass Cond	239	0		239	0.88	*	239	0.99	*	-1,139	-1,139	15.75
Wall Cond	747	183		929	3.43	*	747	3.10	*	-2,286	-2,870	39.68
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	1,581	1,042		2,623	9.67	*	1,581	6.56	*	-3,426	-7,234	100.00
Internal Loads												
Lights	19,780	0		19,780	72.95	*	19,780	82.11	*	0	0	0.00
People	4,712			4,712	17.38	*	2,223	9.23	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	24,492	0	0	24,492	90.33	*	22,002	91.34	*	0	0	0.00
Ceiling Load	1,918	-1,918		0	0.00	*	506	2.10	*	-243	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	-0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	27,991	-876	0	27,115	100.00	*	24,089	100.00	*	-3,668	-7,234	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total	Glass (sf)	(%)
Main Clg	2.3	27.1	17,730	76.6 69.9 102.0	73.8 69.4 104.3	Floor	4,100	
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Part	0	
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	0	
Totals	2.3	27.1				Roof	580	0 0
						Wall	196	21 11

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
Main Htg	-9.8	17,730	67.7	68.2	Vent	0	0	Clg Cfm/Sqft	4.32	SADB	73.8	68.2
Aux Htg	0.0	0	0.0	0.0	Infil	0	0	Clg Cfm/Ton	7846.61	Plenum	76.5	67.7
Preheat	-117.0	17,730	67.7	73.8	Supply	17,730	17,730	Clg Sqft/Ton	1814.50	Return	79.7	67.7
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	6.61	Ret/OA	76.6	67.7
Humidif	0.0	0	0.0	0.0	Return	0	17,730	No. People	10	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-9.8				Rm Exh	17,730	0	Htg Cfm/Sqft	4.32	Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/Sqft	-2.40	Fn Frict	0.0	0.0

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 3 Block INDFP - 4-PIPE INDUCTION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/19 * Mo/Hr: 13/1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 85 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	474	21,484		21,957	1.29	*	664	0.10	*	-1,579	-73,446	3.84
Glass Solar	171,927	0		171,927	10.09	*	185,822	28.71	*	0	0	0.00
Glass Cond	53,830	0		53,830	3.16	*	40,082	6.19	*	-276,287	-276,287	14.45
Wall Cond	113,330	16,902		130,232	7.64	*	168,977	26.10	*	-328,407	-377,319	19.74
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	736,354			736,354	43.20	*	170,578	26.35	*	-1,184,852	-1,184,852	61.97
Sub Total==>	1,075,915	38,386		1,114,301	65.38	*	566,123	87.46	*	-1,791,125	-1,911,905	100.00
Internal Loads												
Lights	179,324	0		179,324	10.52	*	51,508	7.96	*	0	0	0.00
People	45,248			45,248	2.65	*	6,070	0.94	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	224,572	0	0	224,572	13.18	*	57,577	8.89	*	0	0	0.00
Ceiling Load	14,654	-14,654		0	0.00	*	23,486	3.63	*	-47,811	0	0.00
Outside Air	0	0	0	252,361	14.81	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				110,564	6.49	*		0.00	*		0	0.00
Ret. Fan Heat		13,820		13,820	0.81	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	119			119	0.01	*	119	0.02	*	0	0	0.00
Exhaust Heat		-11,266	0	-11,266	-0.66	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	1,315,260	26,287	0	1,704,471	100.00	*	647,306	100.00	*	-1,838,936	-1,911,905	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	46.4	557.0	402.9	19,435 80.9 66.7 78.0	59.9 57.7 69.7	41,364		
Aux Clg	88.4	1,060.6	673.0	32,434 75.0 63.9 73.7	65.1 53.0 42.1	0		
Opt Vent	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	134.8	1,617.6				28,354	5,152	18

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	30.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F								
Main Htg	-681.0	19,435	64.5	96.7	Vent	5,830	0	Clg Cfm/Sqft	0.47	SADB	65.1	96.7
Aux Htg	-1,230.9	32,434	68.0	102.9	Infil	17,013	17,013	Clg Cfm/Ton	418.73	Plenum	76.1	64.4
Preheat	-0.0	19,435	64.5	59.9	Supply	19,435	19,435	Clg Sqft/Ton	891.20	Return	76.8	64.5
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	13.46	Ret/OA	80.9	64.5
Humidif	0.0	0	0.0	0.0	Return	19,435	19,435	No. People	98	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	5,830	0	Htg % OA	0.0	Fn MtrTD	1.3	1.3
Total	-1,911.9				Rm Exh	0	0	Htg Cfm/Sqft	0.47	Fn BldTD	1.0	1.0
					Auxil	32,434	32,434	Htg Btuh/Sqft	-16.46	Fn Frict	2.9	2.9

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 4 Block UH - UNIT HEATERS

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Wall Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Partition	0			0	0.00	*	0	0.00	*	-6,715	-6,715	100.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-6,715	-6,715	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-6,715	-6,715	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total	Glass (sf)	(%)
Main Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Floor	2,544	
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Part	1,632	
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	0	
Totals	0.0	0.0	0			Roof	0	0 0
						Wall	0	0 0

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
Main Htg	-6.7	1,835	68.0	71.4	Vent	0	0	Clg Cfm/Sqft	0.00	SADB	0.0	71.4
Aux Htg	0.0	0	0.0	0.0	Infil	0	0	Clg Cfm/Ton	0.00	Plenum	0.0	68.0
Preheat	0.0	0	0.0	0.0	Supply	0	1,835	Clg Sqft/Ton	0.00	Return	0.0	68.0
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	68.0
Humidif	0.0	0	0.0	0.0	Return	0	1,835	No. People	0	Runarnd	0.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-6.7				Rm Exh	0	0	Htg Cfm/Sqft	0.72	Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/Sqft	-2.64	Fn Frict	0.1	0.0

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 5 Block DD - DOUBLE DUCT

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	14,486	0		14,486	2.21	*	16,221	7.66	*	-48,286	-48,286	21.28
Glass Solar	17,909	0		17,909	2.74	*	16,285	7.69	*	0	0	0.00
Glass Cond	4,840	0		4,840	0.74	*	5,167	2.44	*	-24,690	-24,690	10.88
Wall Cond	4,161	526		4,687	0.72	*	5,622	2.65	*	-16,677	-18,921	8.34
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	29,570			29,570	4.52	*	16,324	7.71	*	-67,403	-67,403	29.70
Sub Total==>	70,966	526		71,492	10.92	*	59,619	28.14	*	-157,056	-159,300	70.19
Internal Loads						*			*			
Lights	123,012	0		123,012	18.79	*	129,725	61.24	*	0	0	0.00
People	30,203			30,203	4.61	*	14,612	6.90	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	153,215	0	0	153,215	23.40	*	144,337	68.14	*	0	0	0.00
Ceiling Load	1,375	-1,375		0	0.00	*	1,553	0.73	*	-4,627	0	0.00
Outside Air	0	0	0	255,335	39.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				158,470	24.20	*		0.00	*		0	0.00
Ret. Fan Heat		19,809		19,809	3.03	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	6,326			6,326	0.97	*	6,326	2.99	*	-67,648	-67,648	29.81
Exhaust Heat		-9,934	0	-9,934	-1.52	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	-0.00	*		0.00	*		0	0.00
Grand Total==>	231,882	9,026	0	654,712	100.00	*	211,835	100.00	*	-229,331	-226,948	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	54.6	654.7	510.6	27,856	80.4 69.0 91.0	62.8 62.1 84.9	27,121	
Aux Clg	0.0	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0	
Opt Vent	0.0	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	0	
Totals	54.6	654.7					8,563	0 0
							1,613	460 29

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	30.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F				Clg Cfm/Sqft	1.03	SAOB	68.0	75.6
Main Htg	-245.5	27,856	67.5	75.6	Vent	8,357	0	Clg Cfm/Ton	510.56	Plenum	75.4	66.5
Aux Htg	0.0	0	0.0	0.0	Infil	968	968	Clg Sqft/Ton	497.09	Return	76.1	67.5
Preheat	-435.2	27,856	48.4	62.8	Supply	27,856	27,856	Clg Btuh/Sqft	24.14	Ret/OA	80.4	67.5
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	No. People	65	Runarnd	75.0	68.0
Humidif	0.0	0	0.0	0.0	Return	27,856	27,856	Htg % OA	0.0	Fn MtrTD	1.3	1.3
Opt Vent	0.0	0	0.0	0.0	Exhaust	8,357	0	Htg Cfm/Sqft	1.03	Fn BldTD	1.0	1.0
Total	-680.6				Rm Exh	0	0	Htg Btuh/Sqft	-25.10	Fn Frict	2.9	2.5
					Auxil	0	0					

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 6 Block DD - DOUBLE DUCT

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==>		Mo/Hr: 7/14		*	Mo/Hr: 7/16		*	Mo/Hr: 13/ 1		
Outside Air ==>		OADB/WB/HR: 91/ 74/105.0		*	OADB: 91		*	OADB: 4		
				*			*			
	Space	Ret. Air	Ret. Air	Net	Perct	Space	Perct	Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot	Sensible	Of Tot	Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	(Btuh)	(%)	(Btuh)	(Btuh)	(%)
Envelope Loads										
Skylite Solr	0	0		0	0.00	0	0.00	0	0	0.00
Skylite Cond	0	0		0	0.00	0	0.00	0	0	0.00
Roof Cond	14,486	0		14,486	2.21	16,221	7.66	-48,286	-48,286	21.28
Glass Solar	17,909	0		17,909	2.74	16,285	7.69	0	0	0.00
Glass Cond	4,840	0		4,840	0.74	5,167	2.44	-24,690	-24,690	10.88
Wall Cond	4,161	526		4,687	0.72	5,622	2.65	-16,677	-18,921	8.34
Partition	0			0	0.00	0	0.00	0	0	0.00
Exposed Floor	0			0	0.00	0	0.00	0	0	0.00
Infiltration	29,570			29,570	4.52	16,324	7.71	-67,403	-67,403	29.70
Sub Total==>	70,966	526		71,492	10.92	59,619	28.14	-157,056	-159,300	70.19
Internal Loads										
Lights	123,012	0		123,012	18.79	129,725	61.24	0	0	0.00
People	30,203			30,203	4.61	14,612	6.90	0	0	0.00
Misc	0	0	0	0	0.00	0	0.00	0	0	0.00
Sub Total==>	153,215	0	0	153,215	23.40	144,337	68.14	0	0	0.00
Ceiling Load	1,375	-1,375		0	0.00	1,553	0.73	-4,627	0	0.00
Outside Air	0	0	0	255,335	39.00	0	0.00	0	0	0.00
Sup. Fan Heat				158,470	24.20		0.00		0	0.00
Ret. Fan Heat		19,809		19,809	3.03		0.00		0	0.00
Duct Heat Pkup		0		0	0.00		0.00		0	0.00
OV/UNDR Sizing	6,326			6,326	0.97	6,326	2.99	-67,648	-67,648	29.81
Exhaust Heat		-9,934	0	-9,934	-1.52		0.00		0	0.00
Terminal Bypass		0	0	0	-0.00		0.00		0	0.00
Grand Total==>	231,882	9,026	0	654,712	100.00	211,835	100.00	-229,331	-226,948	100.00

-----COOLING COIL SELECTION-----

-----AREAS-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor		
Main Clg	54.6	654.7	27,856	80.4	69.0	91.0	62.8	62.1	84.9	Part	0	
Aux Clg	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0	
Opt Vent	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	8,563	0 0
Totals	54.6	654.7								Wall	1,613	460 29

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	30.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent	8,357	0	Clg Cfm/Sqft	1.03	SADB	68.0	75.6
Main Htg	-245.5	27,856	67.5	75.6	Infil	968	968	Clg Cfm/Ton	510.56	Plenum	75.4	66.5
Aux Htg	0.0	0	0.0	0.0	Supply	27,856	27,856	Clg Sqft/Ton	497.09	Return	76.1	67.5
Preheat	-435.2	27,856	48.4	62.8	Mincfm	0	0	Clg Btuh/Sqft	24.14	Ret/OA	80.4	67.5
Reheat	0.0	0	0.0	0.0	Return	27,856	27,856	No. People	65	Runarnd	75.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	8,357	0	Htg % OA	0.0	Fn MtrTD	1.3	1.3
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	1.03	Fn BldTD	1.0	1.0
Total	-680.6				Auxil	0	0	Htg Btuh/Sqft	-25.10	Fn Frict	2.9	2.9

BUILDING U-VALUES - ALTERNATIVE 3
REPLACE FLUORESCENT FIXTURES

----- B U I L D I N G U - V A L U E S -----

Room Number	Description	Part.	ExFlr	Room U-Values (Btu/hr/sqft/F)							Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
				Summr Skylt	Wintr Skylt	Summr Roof	Wintr Windo	Summr Windo	Wall	Ceil.		
1	SUB BSMT, BSMT W	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
Zone	1 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
4	BSMT E	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
Zone	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
System	1 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.4	9.54
2	TOILETS, KITCHEN	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	29.4	5.93
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	29.4	5.93
11	TOILETS W ROOF	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
Zone	11 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	35.3	7.23
3	STAIRS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.229	0.000	103.3	21.63
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.229	0.000	103.3	21.63
5	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	57.9	12.05
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	57.9	12.05
7	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	56.7	11.81
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	56.7	11.81
9	3RD FL OFFICES	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	102.3	21.84
Zone	9 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	102.3	21.84
12	STAIRS W ROOF	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.229	0.000	146.4	31.13
Zone	12 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.229	0.000	146.4	31.13
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.256	0.317	74.1	15.63
13	SUPPLY STORAGE	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
Zone	13 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
System	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
6	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
8	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
10	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
Zone	10 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
System	5 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	43.1	8.94
14	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
Zone	14 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
15	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
Zone	15 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
16	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
Zone	16 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
System	6 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	43.1	8.94
Building		0.229	0.000	0.000	0.000	0.088	0.810	0.837	0.256	0.317	52.6	10.93

BUILDING AREAS - ALTERNATIVE 3
REPLACE FLUORESCENT FIXTURES

BUILDING AREAS

Room Number	Description	Number of Duplicate Flr Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	SUB BSMT, BSMT W	1	1	45,125	45,125	13,222	0	0	0	0	0	0
Zone	1 Total/Ave.			45,125	13,222	0	0	0	0	0	0	0
4	BSMT E	1	1	12,424	12,424	3,348	0	0	0	0	0	0
Zone	4 Total/Ave.			12,424	3,348	0	0	0	0	0	0	0
System	1 Total/Ave.			57,549	16,570	0	0	0	0	0	0	0
2	TOILETS, KITCHEN	1	1	3,520	3,520	0	0	0	0	21	11	174
Zone	2 Total/Ave.			3,520	0	0	0	0	0	21	11	174
11	TOILETS W ROOF	1	1	580	580	0	0	0	580	0	0	0
Zone	11 Total/Ave.			580	0	0	0	0	580	0	0	0
System	2 Total/Ave.			4,100	0	0	0	0	580	21	11	174
3	STAIRS	1	1	560	560	0	0	0	0	255	29	625
Zone	3 Total/Ave.			560	0	0	0	0	0	255	29	625
5	1ST FL OFFICES	1	1	11,724	11,724	0	0	0	0	1,573	19	6,530
Zone	5 Total/Ave.			11,724	0	0	0	0	0	1,573	19	6,530
7	2ND FL OFFICES	1	1	14,400	14,400	0	0	0	0	1,610	17	7,730
Zone	7 Total/Ave.			14,400	0	0	0	0	0	1,610	17	7,730
9	3RD FL OFFICES	1	1	14,400	14,400	0	0	0	14,400	1,610	17	8,010
Zone	9 Total/Ave.			14,400	0	0	0	0	14,400	1,610	17	8,010
12	STAIRS W ROOF	1	1	280	280	0	0	0	280	105	25	307
Zone	12 Total/Ave.			280	0	0	0	0	280	105	25	307
System	3 Total/Ave.			41,364	0	0	0	0	14,680	5,152	18	23,202
13	SUPPLY STORAGE	1	1	2,544	2,544	1,632	0	0	0	0	0	0
Zone	13 Total/Ave.			2,544	1,632	0	0	0	0	0	0	0
System	4 Total/Ave.			2,544	1,632	0	0	0	0	0	0	0
6	1ST FL CEN OFFCS	1	1	9,884	9,884	0	0	0	0	250	19	1,038
Zone	6 Total/Ave.			9,884	0	0	0	0	0	250	19	1,038
8	2ND FL CEN OFFCS	1	1	8,674	8,674	0	0	0	0	105	66	55
Zone	8 Total/Ave.			8,674	0	0	0	0	0	105	66	55
10	3RD FL CEN OFFCS	1	1	8,563	8,563	0	0	0	8,563	105	64	60
Zone	10 Total/Ave.			8,563	0	0	0	0	8,563	105	64	60
System	5 Total/Ave.			27,121	0	0	0	0	8,563	460	29	1,153
14	1ST FL CEN OFFCS	1	1	9,884	9,884	0	0	0	0	250	19	1,038
Zone	14 Total/Ave.			9,884	0	0	0	0	0	250	19	1,038
15	2ND FL CEN OFFCS	1	1	8,674	8,674	0	0	0	0	105	66	55
Zone	15 Total/Ave.			8,674	0	0	0	0	0	105	66	55
16	3RD FL CEN OFFCS	1	1	8,563	8,563	0	0	0	8,563	105	64	60
Zone	16 Total/Ave.			8,563	0	0	0	0	8,563	105	64	60
System	6 Total/Ave.			27,121	0	0	0	0	8,563	460	29	1,153
Building				159,799	18,202	0	0	0	32,386	6,095	19	25,681

ASHRAE 90 ANALYSIS - ALTERNATIVE 3
REPLACE FLUORESCENT FIXTURES

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.088 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.362 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.224 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.96 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTVw) = 24.46 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 3
REPLACE FLUORESCENT FIXTURES

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	15.5	0	0	-205,262	15	202	6,544.3	0	0	0.0	0	0
5 - 10	31.0	9	100	-410,523	7	93	13,088.7	0	0	0.0	0	0
10 - 15	46.6	7	72	-615,785	4	57	19,633.1	0	0	0.0	0	0
15 - 20	62.1	13	135	-821,046	5	68	26,177.4	0	0	0.0	0	0
20 - 25	77.6	6	65	-1,026,308	1	17	32,721.7	0	0	0.0	0	0
25 - 30	93.1	11	113	-1,231,569	8	104	39,266.1	0	0	0.0	0	0
30 - 35	108.6	18	189	-1,436,831	8	109	45,810.5	0	0	0.0	0	0
35 - 40	124.2	4	38	-1,642,093	14	194	52,354.8	0	0	0.0	0	0
40 - 45	139.7	4	45	-1,847,354	37	497	58,899.2	0	0	0.0	0	0
45 - 50	155.2	6	63	-2,052,616	0	0	65,443.5	0	0	0.0	0	0
50 - 55	170.7	5	50	-2,257,878	0	0	71,987.9	0	0	0.0	0	0
55 - 60	186.2	1	15	-2,463,139	0	0	78,532.2	0	0	0.0	0	0
60 - 65	201.8	7	80	-2,668,401	0	0	85,076.6	0	0	0.0	0	0
65 - 70	217.3	6	60	-2,873,662	0	0	91,620.9	0	0	0.0	0	0
70 - 75	232.8	3	35	-3,078,924	0	0	98,165.3	0	0	0.0	0	0
75 - 80	248.3	1	10	-3,284,186	0	0	104,709.6	0	0	0.0	0	0
80 - 85	263.8	0	0	-3,489,447	0	0	111,254.0	0	0	0.0	0	0
85 - 90	279.4	0	0	-3,694,709	0	0	117,798.3	100	2,520	0.0	0	0
90 - 95	294.9	0	0	-3,899,971	0	0	124,342.7	0	0	0.0	0	0
95 - 100	310.4	0	0	-4,105,232	0	0	130,887.0	0	0	0.0	0	0
Hours Off	0.0	0	7,690	0	0	7,419	0.0	0	6,240	0.0	0	8,760

BUILDING TEMPERATURE PROFILES

[illegible]

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 3
REPLACE FLUORESCENT FIXTURES

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	STEAM	STEAM DMND	
	Off Peak (kWh)	On Peak (kW)	On Peak (Thrm)	WATER (1000 G1)	On Peak (Thrm/hr)
Jan	135,416	667	12,925	0	65
Feb	122,519	667	12,105	0	65
March	147,735	667	10,306	0	65
April	123,809	667	3,053	0	52
May	159,200	779	0	51	0
June	164,416	835	0	87	0
July	163,349	885	0	158	0
Aug	172,958	844	0	97	0
Sept	145,106	807	0	49	0
Oct	135,567	667	2,033	0	49
Nov	127,595	667	5,605	0	62
Dec	128,968	667	11,211	0	65
Total	1,726,640	885	57,237	442	65

Building Energy Consumption = 72,696 (Btu/Sq Ft/Year)
Source Energy Consumption = 158,402 (Btu/Sq Ft/Year)

Floor Area = 159,799 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION

Ref	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	50971	46117	55825	48544	53398	53398	48544	55825	48544	53398	48544	48544	611,651
	PK	265.3	265.3	265.3	265.3	265.3	265.3	265.3	265.3	265.3	265.3	265.3	265.3	265.3
-1	MISC LD													
	ELEC	0	0	0	0	-0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTW20	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1001S		2-STG CTV <555 TONS											
	ELEC	0	0	0	0	11057	16273	28674	18082	10430	0	0	0	84,515
	PK	0.0	0.0	0.0	0.0	83.2	139.5	189.6	147.6	110.9	0.0	0.0	0.0	188.6
1	EQ5100		COOLING TOWER											
	ELEC	0	0	0	0	5115	5115	4650	5348	4650	0	0	0	24,878
	PK	0.0	0.0	0.0	0.0	23.3	23.3	23.3	23.3	23.3	0.0	0.0	0.0	23.3
1	EQ5100		COOLING TOWER											
	WATER	0	0	0	0	51	87	158	97	49	0	0	0	442
	PK	0.0	0.0	0.0	0.0	0.5	0.8	1.0	0.8	0.6	0.0	0.0	0.0	1.0
1	EQ5001		CHILLED WATER PUMP C.V.											
	ELEC	0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
	PK	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5010		CONDENSER WATER PUMP C.V.											
	ELEC	0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
	PK	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5300		CONTROL PANEL & INTERLOCK											

1,070
1.0

	ELEC	0	0	0	0	220	220	200	230	200	0	0	0	1,070
	PK	0.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0
2	EQ1000	PREVENTS COOLING ENERGY												
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5001	CHILLED WATER PUMP C.V.												
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5010	CONDENSER WATER PUMP C.V.												
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	9754	8825	10683	9290	10219	10219	9290	10683	9290	10219	9290	9290	117,051
	PK	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4
1	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	2276	2059	2493	2168	2384	2384	2168	2493	2168	2384	2168	2168	27,312
	PK	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
2	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	13975	12644	15305	13309	14640	14640	13309	15305	13309	14640	13309	13309	167,695
	PK	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5
3	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	1747	1580	1913	1664	1830	1830	1664	1913	1664	1830	1664	1664	20,962
	PK	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
5	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	20030	18122	21937	19076	20983	20983	19076	21937	19076	20983	19076	19076	240,355
	PK	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4
5	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	2504	2265	2742	2384	2623	2623	2384	2742	2384	2623	2384	2384	30,044
	PK	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9
6	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	20030	18122	21937	19076	20983	20983	19076	21937	19076	20983	19076	19076	240,355
	PK	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4	95.4
6	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	2504	2265	2742	2384	2623	2623	2384	2742	2384	2623	2384	2384	30,044
	PK	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9
1	EQ2101	PURCHASED DISTRICT STEAM												
	P STEAM	2215	2075	1750	521	0	0	0	0	0	340	961	1921	9,783
	PK	11.1	11.1	11.1	8.9	0.0	0.0	0.0	0.0	0.0	8.3	10.7	11.1	11.1
1	EQ5020	HEAT WATER CIRC. PUMP C.V.												

ELEC	6264	5667	6294	2863	0	0	0	0	0	2416	5011	5966
PK	29.8	29.8	29.8	29.8	0.0	0.0	0.0	0.0	0.0	29.8	29.8	29.8

34,481
29.8

CONDENSATE RETURN PUMP

ELEC	117	106	118	54	0	0	0	0	0	45	94	112
PK	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.6

645
0.6

PURCHASED DISTRICT STEAM

P STEAM	10710	10030	8556	2532	0	0	0	0	0	1693	4644	9289
PK	53.6	53.6	53.6	43.3	0.0	0.0	0.0	0.0	0.0	39.9	51.6	53.6

47,454
53.6

HEAT WATER CIRC. PUMP C.V.

ELEC	5220	4723	5717	2983	- 0	0	0	0	0	3405	4574	4971
PK	24.9	24.9	24.9	24.9	0.0	0.0	0.0	0.0	0.0	24.9	24.9	24.9

31,593
24.9

CONDENSATE RETURN PUMP

ELEC	26	23	28	15	0	0	0	0	0	17	23	25
PK	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1

157
0.1

PREVENT SUM OF HEAT ENERGY

[illegible]

0.0

HEAT WATER CIRC. PUMP C.V.

[illegible]

0.0

UTILITY PEAK CHECKSUMS - ALTERNATIVE 3
REPLACE FLUORESCENT FIXTURES

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 884.5 (kW)
Yearly Time of Peak 13 (hr) 7 (mo)

Hour 13 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Perct Of Tot (%)
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Cooling Equipment

1	EQ1001S	2-STG CTV <555 TONS	272.5	30.81
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Sub Total			272.5	30.81
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Sub Total			0.0	0.00
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Air Moving Equipment

1		SUMMATION OF FAN ELECTRICAL DEMAND	57.3	6.48
3		SUMMATION OF FAN ELECTRICAL DEMAND	74.9	8.46
5		SUMMATION OF FAN ELECTRICAL DEMAND	107.3	12.13
6		SUMMATION OF FAN ELECTRICAL DEMAND	107.3	12.13

Sub Total			346.8	39.20
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Sub Total			0.0	0.00
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Miscellaneous

Lights			265.3	29.99
Base Utilities			0.0	0.00
Misc Equipment			0.0	0.00
Sub Total			265.3	29.99

Grand Total			884.5	100.00
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**          T R A C E    6 0 0    A N A L Y S I S          **  
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 122

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Relactance: 0.20
Winter Ground Relactance: 0.20

Air Density: 0.0742 (lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 12:55:35 2/ 2/94
Dataset Name: CB122B .TM

AIRFLOW - ALTERNATIVE 4
HEAT RECOVERY

----- SYSTEM SUMMARY -----
(Design Airflow Quantities)

System Number	System Type	Main					Auxil.	Room
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	TRH	10,853	36,175	36,175	36,175	10,853	0	0
2	SZ	0	17,730	17,730	17,730	0	0	17,730
3	INDFP	5,830	19,435	19,435	36,448	22,843	37,165	0
4	UH	0	0	1,835	0	0	0	0
5	DD	8,357	27,856	27,856	28,824	9,325	0	0
6	DD	8,357	27,856	27,856	28,824	9,325	0	0
Totals		33,397	129,052	130,887	148,000	52,345	37,165	17,730

CAPACITY - ALTERNATIVE 4
HEAT RECOVERY

----- SYSTEM SUMMARY -----
(Design Capacity Quantities)

System Number	System Type	Cooling					Heating					
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	TRH	81.5	0.0	0.0	81.5	-68,182	0	-480,162	0	0	0	-548,345
2	SZ	3.2	0.0	0.0	3.2	-9,837	0	-106,277	0	0	0	-9,837
3	INDFP	46.4	102.4	0.0	148.8	-680,963	-1,230,942	0	0	0	0	-1,911,905
4	UH	0.0	0.0	0.0	0.0	-6,715	0	0	0	0	0	-6,715
5	DD	63.1	0.0	0.0	63.1	-245,454	0	-365,035	0	0	0	-610,489
6	DD	63.1	0.0	0.0	63.1	-245,454	0	-365,035	0	0	0	-610,489
Totals		257.3	102.4	0.0	359.7	-1,256,606	-1,230,942	-1,316,509	0	0	0	-3,697,779

The building peaked at hour 14 month 7 with a capacity of 257.3 tons

ENGINEERING CHECKS - ALTERNATIVE 4
HEAT RECOVERY

----- ENGINEERING CHECKS -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	----- Cooling -----				--- Heating ---		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	TRH	30.00	0.63	443.7	705.9	17.00	0.63	-9.53	57,549
2	Main	SZ	0.00	4.32	5,605.2	1,296.2	9.26	4.32	-2.40	4,100
3	Main	INDFP	30.00	0.47	418.7	891.2	13.46	0.47	-16.46	41,364
3	Auxiliary	INDFP	0.00	0.90	363.0	404.1	29.70	0.90	-29.76	41,364
4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.72	-2.64	2,544
5	Main	DD	30.00	1.03	441.4	429.7	27.92	1.03	-22.51	27,121
6	Main	DD	30.00	1.03	441.4	429.7	27.92	1.03	-22.51	27,121

System 1 Peak TRH - TERMINAL REHEAT

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads						*			*			
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Wall Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Partition	18,940			18,940	1.94	*	18,940	4.00	*	-68,182	-68,182	100.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	18,940	0		18,940	1.94	*	18,940	4.00	*	-68,182	-68,182	100.00
Internal Loads						*			*			
Lights	398,781	0		398,781	40.76	*	424,020	89.45	*	0	0	0.00
People	63,941			63,941	6.54	*	31,097	6.56	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	462,722	0	0	462,722	47.30	*	455,117	96.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	406,913	41.59	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				77,173	7.89	*		0.00	*		0	0.00
Ret. Fan Heat		18,007		18,007	1.84	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	-0.00	*	0	-0.00	*	0	0	0.00
Exhaust Heat		-5,402	0	-5,402	-0.55	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	481,661	12,605	0	978,353	100.00	*	474,057	100.00	*	-68,182	-68,182	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total	Glass (sf)	(%)
Main Clg	81.5	978.4	719.6	36,175	80.0 67.5 83.9	61.0 59.3 74.8	Floor 57,549	
Aux Clg	0.0	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Part 16,570	
Opt Vent	0.0	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	ExFlr 0	
Totals	81.5	978.4					Roof 0	0 0
							Wall 0	0 0

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling Cooling	Heating	Clg % OA	30.0	Type	Clg	Htg
Main Htg	-68.2	36,175	68.0	69.7	Vent	10,853	0	Clg Cfm/Sqft	0.63	SADB	63.0	69.7
Aux Htg	0.0	0	0.0	0.0	Infil	0	0	Clg Cfm/Ton	443.70	Plenum	75.0	68.0
Preheat	-480.2	36,175	48.8	61.0	Supply	36,175	36,175	Clg Sqft/Ton	705.87	Return	75.5	68.0
Reheat	-0.0	0	0.0	0.0	Mincfm	36,175	0	Clg Btuh/Sqft	17.00	Ret/OA	80.0	68.0
Humidif	0.0	0	0.0	0.0	Return	36,175	36,175	No. People	137	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	10,853	0	Htg % OA	0.0	Fn MtrTD	0.5	0.5
Total	-548.3				Rm Exh	0	0	Htg Cfm/Sqft	0.63	Fn BldTD	0.4	0.4
					Auxil	0	0	Htg Btuh/Sqft	-9.53	Fn Frict	1.1	1.1

System 2 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==> Mo/Hr: 7/16 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct	Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot	Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)	(Btuh)	(Btuh)	(%)
Envelope Loads											
Skylite Solr	0	0		0	0.00	*	0	0.00	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	0	0	0.00
Roof Cond	0	860		860	2.26	*	0	0.00	0	-3,224	44.57
Glass Solar	595	0		595	1.57	*	595	1.71	0	0	0.00
Glass Cond	239	0		239	0.63	*	239	0.69	-1,139	-1,139	15.75
Wall Cond	747	183		929	2.45	*	747	2.14	-2,286	-2,870	39.68
Partition	0			0	0.00	*	0	0.00	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	0	0	0.00
Sub Total==>	1,581	1,042		2,623	6.91	*	1,581	4.54	-3,426	-7,234	100.00
Internal Loads						*					
Lights	30,623	0		30,623	80.68	*	30,623	87.96	0	0	0.00
People	4,712			4,712	12.41	*	2,223	6.38	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	0	0	0.00
Sub Total==>	35,335	0	0	35,335	93.09	*	32,845	94.34	0	0	0.00
Ceiling Load	1,918	-1,918		0	0.00	*	389	1.12	-243	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00		0	0.00
OV/UNDR Sizing	0			0	-0.00	*	0	-0.00	0	0	-0.00
Exhaust Heat		0	0	0	0.00	*		0.00		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00		0	0.00
Grand Total==>	38,834	-876	0	37,958	100.00	*	34,815	100.00	-3,668	-7,234	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor		
Main Clg	3.2	38.0	35.5	76.6	68.9	96.8	73.2	68.3	99.1	4,100		
Aux Clg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0		
Opt Vent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0		
Totals	3.2	38.0								Roof	580	0 0
										Wall	196	21 11

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	--ENGINEERING CHECKS--		--TEMPERATURES (F)--		
	(Mbh)	(cfm)	Deg F	Deg F				Clg % OA	0.0	Type	Clg	Htg
Main Htg	-9.8	17,730	67.7	68.2	Vent	0	0	Clg Cfm/Sqft	4.32	SADB	73.2	68.2
Aux Htg	0.0	0	0.0	0.0	Infil	0	0	Clg Cfm/Ton	5605.16	Plenum	76.5	67.7
Preheat	-106.3	17,730	67.7	73.2	Supply	17,730	17,730	Clg Sqft/Ton	1296.17	Return	79.7	67.7
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	9.26	Ret/OA	76.6	67.7
Humidif	0.0	0	0.0	0.0	Return	0	17,730	No. People	10	Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-9.8				Rm Exh	17,730	0	Htg Cfm/Sqft	4.32	Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/Sqft	-2.40	Fn Frict	0.0	0.0

System 3 Block INDFP - 4-PIPE INDUCTION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/19 * Mo/Hr: 13/1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 85 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	474	21,484		21,957	1.22	*	664	0.10	*	-1,579	-73,446	3.84
Glass Solar	171,927	0		171,927	9.54	*	185,822	27.51	*	0	0	0.00
Glass Cond	53,830	0		53,830	2.99	*	40,082	5.93	*	-276,287	-276,287	14.45
Wall Cond	113,330	16,902		130,232	7.22	*	168,977	25.01	*	-328,407	-377,319	19.74
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	736,354			736,354	40.85	*	170,578	25.25	*	-1,184,852	-1,184,852	61.97
Sub Total==>	1,075,915	38,386		1,114,301	61.81	*	566,123	83.80	*	-1,791,125	-1,911,905	100.00
Internal Loads												
Lights	277,628	0		277,628	15.40	*	79,744	11.80	*	0	0	0.00
People	45,248			45,248	2.51	*	6,070	0.90	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	322,876	0	0	322,876	17.91	*	85,814	12.70	*	0	0	0.00
Ceiling Load	14,654	-14,654		0	0.00	*	23,486	3.48	*	-47,811	0	0.00
Outside Air	0	0	0	252,361	14.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				110,564	6.13	*		0.00	*		0	0.00
Ret. Fan Heat		13,820		13,820	0.77	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	119			119	0.01	*	119	0.02	*	0	0	0.00
Exhaust Heat		-11,266	0	-11,266	-0.62	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	1,413,564	26,287	0	1,802,776	100.00	*	675,542	100.00	*	-1,838,936	-1,911,905	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor		
Main Clg	46.4	557.0	402.9	80.9	66.7	78.0	59.9	57.7	69.7	Part	0	
Aux Clg	102.4	1,228.4	771.3	75.0	64.2	74.9	65.1	53.2	42.8	ExFlr	0	
Opt Vent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	14,680	0 0
Totals	148.8	1,785.4								Wall	28,354	5,152 18

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	--ENGINEERING CHECKS--			--TEMPERATURES (F)--		
	(Mbh)	(cfm)	Deg F	Deg F				Clg % OA	30.0	Type	Clg	Htg	
Main Htg	-681.0	19,435	64.5	96.7	Vent	5,830	0	Clg Cfm/Sqft	0.47	SADB	65.1	96.7	
Aux Htg	-1,230.9	37,165	68.0	98.5	Infil	17,013	17,013	Clg Cfm/Ton	418.73	Plenum	76.1	64.4	
Preheat	-0.0	19,435	64.5	59.9	Supply	19,435	19,435	Clg Sqft/Ton	891.20	Return	76.8	64.5	
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	13.46	Ret/OA	80.9	64.5	
Humidif	0.0	0	0.0	0.0	Return	19,435	19,435	No. People	98	Runarnd	75.0	68.0	
Opt Vent	0.0	0	0.0	0.0	Exhaust	5,830	0	Htg % OA	0.0	Fn MtrTD	1.3	1.3	
Total	-1,911.9				Rm Exh	0	0	Htg Cfm/Sqft	0.47	Fn 8ldTD	1.0	1.0	
					Auxil	37,165	37,165	Htg Btuh/Sqft	-16.46	Fn Frict	2.9	2.9	

System 4 Block UH - UNIT HEATERS

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Percent Of Tot (%)	*	Space Sensible (Btuh)	Percent Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Percent Of Tot (%)
Envelope Loads						*			*			
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Wall Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Partition	0			0	0.00	*	0	0.00	*	-6,715	-6,715	100.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-6,715	-6,715	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-6,715	-6,715	100.00

-----COOLING COIL SELECTION-----

-----AREAS-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total Floor	Glass (sf)	(%)
Main Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Part	2,544	
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	1,632	
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Roof	0	0 0
Totals	0.0	0.0				Wall	0	0 0

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
Main Htg	-6.7	1,835	68.0	71.4	Vent	0	0	Clg Cfm/Sqft	0.00	SADB	0.0	71.4
Aux Htg	0.0	0	0.0	0.0	Infil	0	0	Clg Cfm/Ton	0.00	Plenum	0.0	68.0
Preheat	0.0	0	0.0	0.0	Supply	0	1,835	Clg Sqft/Ton	0.00	Return	0.0	68.0
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	68.0
Humidif	0.0	0	0.0	0.0	Return	0	1,835	No. People	0	Runarnd	0.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-6.7				Rm Exh	0	0	Htg Cfm/Sqft	0.72	Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/Sqft	-2.64	Fn Frict	0.1	0.0

System 5 Block DD - DOUBLE DUCT

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	14,486	0		14,486	1.91	*	16,221	5.75	*	-48,286	-48,286	21.28
Glass Solar	17,909	0		17,909	2.36	*	16,285	5.78	*	0	0	0.00
Glass Cond	4,840	0		4,840	0.64	*	5,167	1.83	*	-24,690	-24,690	10.88
Wall Cond	4,161	526		4,687	0.62	*	5,622	1.99	*	-16,677	-18,921	8.34
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	33,323			33,323	4.40	*	16,324	5.79	*	-67,403	-67,403	29.70
Sub Total==>	74,719	526		75,245	9.94	*	59,619	21.14	*	-157,056	-159,300	70.19
Internal Loads												
Lights	190,447	0		190,447	25.15	*	200,839	71.22	*	0	0	0.00
People	30,203			30,203	3.99	*	14,612	5.18	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	220,650	0	0	220,650	29.13	*	215,452	76.40	*	0	0	0.00
Ceiling Load	1,375	-1,375		0	0.00	*	1,553	0.55	*	-4,627	0	0.00
Outside Air	0	0	0	287,738	37.99	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				158,470	20.92	*		0.00	*		0	0.00
Ret. Fan Heat		19,809		19,809	2.62	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	5,366			5,366	0.71	*	5,366	1.90	*	-67,648	-67,648	29.81
Exhaust Heat		-9,934	0	-9,934	-1.31	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	-0.00	*		0.00	*		0	0.00
Grand Total==>	302,110	9,026	0	757,343	100.00	*	281,990	100.00	*	-229,331	-226,948	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	63.1	757.3	577.1	27,856 80.4 68.3 87.0	60.5 60.1 79.2	Part	27,121	
Aux Clg	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	0	
Opt Vent	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	Roof	8,563	0 0
Totals	63.1	757.3				Wall	1,613	460 29

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	30.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent	8,357	0	Clg Cfm/Sqft	1.03	SADB	65.7	75.6
Main Htg	-245.5	27,856	67.5	75.6	Infil	968	968	Clg Cfm/Ton	441.37	Plenum	75.4	66.5
Aux Htg	0.0	0	0.0	0.0	Supply	27,856	27,856	Clg Sqft/Ton	429.73	Return	76.1	67.5
Preheat	-365.0	27,856	48.4	60.5	Mincfm	0	0	Clg Btuh/Sqft	27.92	Ret/OA	80.4	67.5
Reheat	0.0	0	0.0	0.0	Return	27,856	27,856	No. People	65	Runarnd	75.0	68.0
Humidif	0.0	0	0.0	0.0	Exhaust	8,357	0	Htg % OA	0.0	Fn MtrTD	1.3	1.3
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	1.03	Fn BldTD	1.0	1.0
Total	-610.5				Auxil	0	0	Htg Btuh/Sqft	-22.51	Fn Frict	2.9	2.9

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 6 Block DD - DOUBLE DUCT

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	14,486	0		14,486	1.91	*	16,221	5.75	*	-48,286	-48,286	21.28
Glass Solar	17,909	0		17,909	2.36	*	16,285	5.78	*	0	0	0.00
Glass Cond	4,840	0		4,840	0.64	*	5,167	1.83	*	-24,690	-24,690	10.88
Wall Cond	4,161	526		4,687	0.62	*	5,622	1.99	*	-16,677	-18,921	8.34
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	33,323			33,323	4.40	*	16,324	5.79	*	-67,403	-67,403	29.70
Sub Total==>	74,719	526		75,245	9.94	*	59,619	21.14	*	-157,056	-159,300	70.19
Internal Loads												
Lights	190,447	0		190,447	25.15	*	200,839	71.22	*	0	0	0.00
People	30,203			30,203	3.99	*	14,612	5.18	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	220,650	0	0	220,650	29.13	*	215,452	76.40	*	0	0	0.00
Ceiling Load	1,375	-1,375		0	0.00	*	1,553	0.55	*	-4,627	0	0.00
Outside Air	0	0	0	287,738	37.99	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				153,470	20.92	*		0.00	*		0	0.00
Ret. Fan Heat		19,809		19,809	2.62	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	5,366			5,366	0.71	*	5,366	1.90	*	-67,648	-67,648	29.81
Exhaust Heat		-9,934	0	-9,934	-1.31	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	-0.00	*		0.00	*		0	0.00
Grand Total==>	302,110	9,026	0	757,343	100.00	*	281,990	100.00	*	-229,331	-226,948	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	63.1	757.3	577.1	27,356 80.4 68.3 87.0	60.5 60.1 79.2	27,121		
Aux Clg	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Opt Vent	0.0	0.0	0.0	0 0.0 0.0 0.0	0.0 0.0 0.0	0		
Totals	63.1	757.3				8,563	0	0
						1,613	460	29

-----HEATING COIL SELECTION-----

Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	30.0	Type	Clg	Htg
(Mbh)	(cfm)	Deg F	Deg F								
Main Htg	-245.5	27,856	67.5	75.6	Vent	8,357	0	Clg Cfm/Sqft	1.03	SAOB	65.7 75.6
Aux Htg	0.0	0	0.0	0.0	Infil	968	968	Clg Cfm/Ton	441.37	Plenum	75.4 66.5
Preheat	-365.0	27,856	48.4	60.5	Supply	27,856	27,856	Clg Sqft/Ton	429.73	Return	76.1 67.5
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	27.92	Ret/OA	80.4 67.5
Humidif	0.0	0	0.0	0.0	Return	27,856	27,856	No. People	65	Runarnd	75.0 68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	8,357	0	Htg % OA	0.0	Fn MtrTD	1.3 1.3
Total	-610.5				Rn Exh	0	0	Htg Cfm/Sqft	1.03	Fn BldTD	1.0 1.0
					Auxil	0	0	Htg Btuh/Sqft	-22.51	Fn Frict	2.9 2.9

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

BUILDING U-VALUES - ALTERNATIVE 4
HEAT RECOVERY

----- B U I L D I N G U - V A L U E S -----												
Room Number	Description	Room U-Values (Btu/hr/sqft/F)									Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
		Part.	ExFlr	Summr Skylt	Wintr Skylt	Roof	Summr Windo	Wintr Windo	Wall	Ceil.		
1	SUB BSMT, BSMT W	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
Zone	1 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
4	BSMT E	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
Zone	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
System	1 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.4	9.54
2	TOILETS, KITCHEN	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	29.4	5.93
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	29.4	5.93
11	TOILETS W ROOF	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
Zone	11 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	35.3	7.23
3	STAIRS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.229	0.000	103.3	21.63
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.229	0.000	103.3	21.63
5	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	57.9	12.05
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	57.9	12.05
7	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	56.7	11.81
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	56.7	11.81
9	3RD FL OFFICES	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	102.3	21.84
Zone	9 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	102.3	21.84
12	STAIRS W ROOF	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.229	0.000	146.4	31.13
Zone	12 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.229	0.000	146.4	31.13
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.256	0.317	74.1	15.63
13	SUPPLY STORAGE	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
Zone	13 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
System	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
6	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
8	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
10	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
Zone	10 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
System	5 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	43.1	8.94
14	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
Zone	14 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.317	32.5	6.60
15	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
Zone	15 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.810	0.837	0.257	0.000	27.0	5.41
16	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
Zone	16 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.000	71.5	15.21
System	6 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.810	0.837	0.257	0.317	43.1	8.94
Building		0.229	0.000	0.000	0.000	0.088	0.810	0.837	0.256	0.317	52.6	10.93

BUILDING AREAS - ALTERNATIVE 4
HEAT RECOVERY

----- B U I L D I N G A R E A S -----												
Room Number	Description	Number of Duplicate Flr Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skf /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	SUB BSMT, BSMT W	1	1	45,125	45,125	13,222	0	0	0	0	0	0
Zone	1 Total/Ave.			45,125	13,222	0	0	0	0	0	0	0
4	BSMT E	1	1	12,424	12,424	3,348	0	0	0	0	0	0
Zone	4 Total/Ave.			12,424	3,348	0	0	0	0	0	0	0
System	1 Total/Ave.			57,549	16,570	0	0	0	0	0	0	0
2	TOILETS, KITCHEN	1	1	3,520	3,520	0	0	0	0	21	11	174
Zone	2 Total/Ave.			3,520	0	0	0	0	0	21	11	174
11	TOILETS W ROOF	1	1	580	580	0	0	0	580	0	0	0
Zone	11 Total/Ave.			580	0	0	0	0	580	0	0	0
System	2 Total/Ave.			4,100	0	0	0	0	580	21	11	174
3	STAIRS	1	1	560	560	0	0	0	0	255	29	625
Zone	3 Total/Ave.			560	0	0	0	0	0	255	29	625
5	1ST FL OFFICES	1	1	11,724	11,724	0	0	0	0	1,573	19	6,530
Zone	5 Total/Ave.			11,724	0	0	0	0	0	1,573	19	6,530
7	2ND FL OFFICES	1	1	14,400	14,400	0	0	0	0	1,610	17	7,730
Zone	7 Total/Ave.			14,400	0	0	0	0	0	1,610	17	7,730
9	3RD FL OFFICES	1	1	14,400	14,400	0	0	0	14,400	1,610	17	8,010
Zone	9 Total/Ave.			14,400	0	0	0	0	14,400	1,610	17	8,010
12	STAIRS W ROOF	1	1	280	280	0	0	0	280	105	25	307
Zone	12 Total/Ave.			280	0	0	0	0	280	105	25	307
System	3 Total/Ave.			41,364	0	0	0	0	14,680	5,152	18	23,202
13	SUPPLY STORAGE	1	1	2,544	2,544	1,632	0	0	0	0	0	0
Zone	13 Total/Ave.			2,544	1,632	0	0	0	0	0	0	0
System	4 Total/Ave.			2,544	1,632	0	0	0	0	0	0	0
6	1ST FL CEN OFFCS	1	1	9,884	9,884	0	0	0	0	250	19	1,038
Zone	6 Total/Ave.			9,884	0	0	0	0	0	250	19	1,038
8	2ND FL CEN OFFCS	1	1	8,674	8,674	0	0	0	0	105	66	55
Zone	8 Total/Ave.			8,674	0	0	0	0	0	105	66	55
10	3RD FL CEN OFFCS	1	1	8,563	8,563	0	0	0	8,563	105	64	60
Zone	10 Total/Ave.			8,563	0	0	0	0	8,563	105	64	60
System	5 Total/Ave.			27,121	0	0	0	0	8,563	460	29	1,153
14	1ST FL CEN OFFCS	1	1	9,884	9,884	0	0	0	0	250	19	1,038
Zone	14 Total/Ave.			9,884	0	0	0	0	0	250	19	1,038
15	2ND FL CEN OFFCS	1	1	8,674	8,674	0	0	0	0	105	66	55
Zone	15 Total/Ave.			8,674	0	0	0	0	0	105	66	55
16	3RD FL CEN OFFCS	1	1	8,563	8,563	0	0	0	8,563	105	64	60
Zone	16 Total/Ave.			8,563	0	0	0	0	8,563	105	64	60
System	6 Total/Ave.			27,121	0	0	0	0	8,563	460	29	1,153
Building				159,799	18,202	0	0	0	32,386	6,095	19	25,681

ASHRAE 90 ANALYSIS - ALTERNATIVE 4
HEAT RECOVERY

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.088 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.362 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.224 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) : 3.96 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTVw) : 24.46 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 4
HEAT RECOVERY

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	18.0	0	0	-190,203	13	170	6,544.3	0	0	0.0	0	0
5 - 10	36.0	0	0	-380,406	10	129	13,088.7	0	0	0.0	0	0
10 - 15	54.0	1	12	-570,609	7	91	19,633.1	0	0	0.0	0	0
15 - 20	71.9	8	86	-760,811	3	34	26,177.4	0	0	0.0	0	0
20 - 25	89.9	11	120	-951,014	1	16	32,721.7	0	0	0.0	0	0
25 - 30	107.9	5	56	-1,141,217	7	89	39,266.1	0	0	0.0	0	0
30 - 35	125.9	10	110	-1,331,420	10	132	45,810.5	0	0	0.0	0	0
35 - 40	143.9	23	245	-1,521,623	13	168	52,354.8	0	0	0.0	0	0
40 - 45	161.9	4	42	-1,711,826	18	223	58,899.2	0	0	0.0	0	0
45 - 50	179.8	8	90	-1,902,029	18	231	65,443.5	0	0	0.0	0	0
50 - 55	197.8	6	67	-2,092,231	0	0	71,987.9	0	0	0.0	0	0
55 - 60	215.8	4	42	-2,282,434	0	0	78,532.2	0	0	0.0	0	0
60 - 65	233.8	3	35	-2,472,637	0	0	85,076.6	0	0	0.0	0	0
65 - 70	251.8	7	75	-2,662,840	0	0	91,620.9	0	0	0.0	0	0
70 - 75	269.8	7	75	-2,853,043	0	0	98,165.3	0	0	0.0	0	0
75 - 80	287.8	1	15	-3,043,246	0	0	104,709.6	0	0	0.0	0	0
80 - 85	305.7	0	0	-3,233,448	0	0	111,254.0	0	0	0.0	0	0
85 - 90	323.7	0	0	-3,423,652	0	0	117,798.3	100	2,520	0.0	0	0
90 - 95	341.7	0	0	-3,613,854	0	0	124,342.7	0	0	0.0	0	0
95 - 100	359.7	0	0	-3,804,057	0	0	130,887.0	0	0	0.0	0	0
Hours Off	0.0	0	7,690	0	0	7,472	0.0	0	6,240	0.0	0	8,760

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 4
HEAT RECOVERY

----- B U I L D I N G T E M P E R A T U R E P R O F I L E S -----																
Temperature Range (F)	----- Zone Number -----															
	1	4	2	11	3	5	7	9	12	13	6	8	10	14	15	16
Max. Temp.	82.6	81.5	201.1	120.2	86.4	85.1	84.9	83.3	85.3	96.2	85.1	88.5	84.5	85.1	88.5	84.5
Mo./Hr.	10 21	10 23	9 19	8 16	7 20	7 24	7 24	7 22	7 20	8 17	7 3 10	1 7 6	7 3 10	1 7 6	1 7 6	1 7 6
Day Type	2	2	2	2	4	1	1	4	4	2	5	2	5	5	2	5
..... Number of Hours																
Above 100	0	0	8,016	4,086	0	0	0	0	0	0	0	0	0	0	0	0
95 - 100	0	0	0	110	0	0	0	0	0	240	0	0	0	0	0	0
90 - 95	0	0	91	1,239	0	0	0	0	0	1,494	0	0	0	0	0	0
85 - 90	0	0	290	253	118	0	0	0	36	1,602	20	537	0	20	537	0
80 - 85	954	517	227	585	1,161	1,221	1,140	704	1,182	1,215	1,939	3,338	1,585	1,939	3,338	1,585
75 - 80	5,027	2,814	136	327	1,752	1,952	2,042	2,359	1,875	818	3,014	4,263	3,756	3,014	4,263	3,756
70 - 75	1,202	3,711	0	1,256	631	601	524	694	596	1,435	1,238	595	1,333	1,238	595	1,333
65 - 70	1,418	1,516	0	726	1,391	1,535	1,595	1,677	1,447	1,579	1,313	27	1,400	1,313	27	1,400
60 - 65	159	202	0	178	1,107	1,076	1,088	1,366	1,166	377	580	0	504	580	0	504
55 - 60	0	0	0	0	915	869	900	789	953	0	293	0	182	293	0	182
50 - 55	0	0	0	0	671	632	626	546	658	0	363	0	0	363	0	0
Below 50	0	0	0	0	1,014	874	845	625	847	0	0	0	0	0	0	0
Min. Temp.	63.8	63.0	68.0	63.6	34.0	34.6	34.7	37.4	35.6	61.7	50.3	67.9	57.5	50.3	67.9	57.5
Mo./Hr.	1 8	1 10	1 1	2 6	2 11	2 7	2 7	2 7	2 7	1 6	2 7	1 7	1 7	2 7	1 7	1 7
Day Type	5	5	1	5	4	5	5	5	5	5	5	1	5	5	1	5

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 4
HEAT RECOVERY

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	STEAM	STEAM DMND	
	Off Peak (kWh)	On Peak (kW)	On Peak (Thrm)	WATER (1000 G1)	On Peak (Thrm/hr)
Jan	163,358	813	11,985	0	65
Feb	147,800	813	11,328	0	65
March	178,338	813	8,748	0	63
April	149,213	813	2,215	0	47
May	192,292	948	0	81	0
June	199,334	1,020	0	127	0
July	196,533	1,068	0	192	0
Aug	209,689	1,021	0	139	0
Sept	175,152	971	0	75	0
Oct	165,049	813	1,307	0	46
Nov	152,314	813	4,498	0	53
Dec	155,579	813	10,159	0	64
Total	2,082,650	1,068	50,241	614	65

Building Energy Consumption = 75,922 (Btu/Sq Ft/Year)
Source Energy Consumption = 175,378 (Btu/Sq Ft/Year)

Floor Area = 159,799 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION

Ref	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	78913	71397	86428	75155	82671	82671	75155	86428	75155	82671	75155	75155	946,954
	PK	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7	410.7
1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH2O	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1001S													
	ELEC	0	0	0	0	14876	21919	35246	24209	13865	0	0	0	110,115
	PK	0.0	0.0	0.0	0.0	106.5	178.5	226.8	179.2	129.8	0.0	0.0	0.0	226.8
1	EQ5100													
	ELEC	0	0	0	0	5115	5115	4650	5348	4650	0	0	0	24,878
	PK	0.0	0.0	0.0	0.0	23.3	23.3	23.3	23.3	23.3	0.0	0.0	0.0	23.3
1	EQ5100													
	WATER	0	0	0	0	81	127	192	139	75	0	0	0	614
	PK	0.0	0.0	0.0	0.0	0.6	1.0	1.2	1.0	0.8	0.0	0.0	0.0	1.2
1	EQ5001													
	ELEC	0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
	PK	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5010													
	ELEC	0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,

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UTILITY PEAK CHECKSUMS - ALTERNATIVE 4
HEAT RECOVERY

----- UTILITY PEAK CHECKSUMS -----

Utility ELECTRIC DEMAND

Peak Value 1,068.1 (kW)
Yearly Time of Peak 14 (hr) 7 (mo)

Hour 14 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Percent Of Tot (%)
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Cooling Equipment

1	EQ1001S	2-STG CTV <555 TONS	310.7	29.09
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Sub Total			310.7	29.09
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Sub Total			0.0	0.00
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Air Moving Equipment

1		SUMMATION OF FAN ELECTRICAL DEMAND	57.3	5.36
3		SUMMATION OF FAN ELECTRICAL DEMAND	74.9	7.01
5		SUMMATION OF FAN ELECTRICAL DEMAND	107.3	10.05
6		SUMMATION OF FAN ELECTRICAL DEMAND	107.3	10.05

Sub Total			346.8	32.46
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Sub Total			0.0	0.00
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Miscellaneous

Lights			410.7	38.45
Base Utilities			0.0	0.00
Misc Equipment			0.0	0.00
Sub Total			410.7	38.45

Grand Total			1,068.1	100.00
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**          TRACE 600 ANALYSIS          **  
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ENERGY SAVINGS OPPORTUNITY STUDY
CARLISLE BARRACKS, PA
DEPARTMENT OF THE ARMY
BENATEC ASSOCIATES
BUILDING 122

Weather File Code: CARLISLE
Location: ENERGY SAVINGS OPPORTUNITY STUDY
Latitude: 40.2 (deg)
Longitude: 77.2 (deg)
Time Zone: 5
Elevation: 475 (ft)
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00
Winter Clearness Number: 1.00
Summer Design Dry Bulb: 92 (F)
Summer Design Wet Bulb: 72 (F)
Winter Design Dry Bulb: 4 (F)
Summer Ground Reflectance: 0.20
Winter Ground Reflectance: 0.20

Air Density: 0.0742 (Lbm/cuft)
Air Specific Heat: 0.2444 (Btu/lbm/F)
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)
Enthalpy Factor: 4.4519 (lb-min./hr/cuft)

Design Simulation Period: May To September
System Simulation Period: January To December
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 14:14: 6 2/ 2/94
Dataset Name: CB122C .TM

AIRFLOW - ALTERNATIVE 1
COMBINED ECOS

----- SYSTEM SUMMARY -----
(Design Airflow Quantities)

System Number	System Type	----- Main -----					Auxil. Supply	Room Exhaust
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Airflow (Cfm)	Airflow (Cfm)
1	TRH	10,853	36,175	36,175	36,175	10,853	0	0
2	SZ	0	1,450	104	1,450	0	0	17,730
3	INDFP	5,830	19,435	19,435	33,612	20,008	25,306	0
4	UH	0	0	1,835	0	0	0	0
5	DD	8,357	27,856	27,856	28,662	9,163	0	0
6	DD	8,357	27,856	27,856	28,662	9,163	0	0
Totals		33,397	112,772	113,261	128,562	49,187	25,306	17,730

CAPACITY - ALTERNATIVE 1
COMBINED ECOS

----- SYSTEM SUMMARY -----
(Design Capacity Quantities)

System Number	System Type	----- Cooling -----					----- Heating -----					
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	TRH	64.2	0.0	0.0	64.2	-68,182	0	-630,301	0	0	0	-698,484
2	SZ	2.2	0.0	0.0	2.2	-8,951	0	0	0	0	0	-8,951
3	INDFP	45.0	70.5	0.0	115.5	-590,294	-1,033,467	0	0	0	0	-1,623,761
4	UH	0.0	0.0	0.0	0.0	-6,715	0	0	0	0	0	-6,715
5	DD	52.7	0.0	0.0	52.7	-208,290	0	-448,421	0	0	0	-656,711
6	DD	52.7	0.0	0.0	52.7	-208,290	0	-448,421	0	0	0	-656,711
Totals		216.8	70.5	0.0	287.3	-1,090,723	-1,033,467	-1,527,143	0	0	0	-3,651,333

The building peaked at hour 14 month 7 with a capacity of 216.8 tons

ENGINEERING CHECKS - ALTERNATIVE 1
COMBINED ECOS

----- ENGINEERING CHECKS -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	----- Cooling -----				--- Heating ---		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	TRH	30.00	0.63	563.3	896.2	13.39	0.63	-12.14	57,549
2	Main	SZ	0.00	0.35	651.8	1,842.8	6.51	0.03	-2.18	4,100
3	Main	INDFP	30.00	0.47	432.2	919.8	13.05	0.47	-14.27	41,364
3	Auxiliary	INDFP	0.00	0.61	359.0	586.7	20.45	0.61	-24.98	41,364
4	Main	UH	0.00	0.00	0.0	0.0	0.00	0.72	-2.64	2,544
5	Main	DD	30.00	1.03	528.9	514.9	23.30	1.03	-24.21	27,121
6	Main	DD	30.00	1.03	528.9	514.9	23.30	1.03	-24.21	27,121

System 1 Peak TRH - TERMINAL REHEAT

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Percent		Space	Percent		Space Peak	Coil Peak	Percent
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Wall Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Partition	18,940			18,940	2.46	*	18,940	5.85	*	-68,182	-68,182	100.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	18,940	0		18,940	2.46	*	18,940	5.85	*	-68,182	-68,182	100.00
Internal Loads												
Lights	257,578	0		257,578	33.43	*	273,881	84.55	*	0	0	0.00
People	63,941			63,941	8.30	*	31,097	9.60	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	321,519	0	0	321,519	41.72	*	304,978	94.15	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	340,359	44.17	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				77,173	10.01	*		0.00	*		0	0.00
Ret. Fan Heat		18,007		18,007	2.34	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		-5,402	0	-5,402	-0.70	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	340,459	12,605	0	770,597	100.00	*	323,917	100.00	*	-68,182	-68,182	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor		
Main Clg	64.2	770.6	578.3	36,175	80.0	68.7	90.2	64.8	62.5	83.4	Part	16,570
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	0
Totals	64.2	770.6									Wall	0

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	--ENGINEERING CHECKS--			--TEMPERATURES (F)---		
	(Mbh)	(cfm)	Deg F	Deg F				Clg % OA	30.0	Type	Clg	Htg	
Main Htg	-68.2	36,175	68.0	69.7	Vent	10,853	0	Clg Cfm/Sqft	0.63	SADB	66.8	69.7	
Aux Htg	0.0	0	0.0	0.0	Infil	0	0	Clg Cfm/Ton	563.33	Plenum	75.0	68.0	
Preheat	-630.3	36,175	48.8	64.8	Supply	36,175	36,175	Clg Sqft/Ton	896.17	Return	75.5	68.0	
Reheat	-0.0	0	0.0	0.0	Mincfm	36,175	0	Clg Btuh/Sqft	13.39	Ret/OA	80.0	68.0	
Humidif	0.0	0	0.0	0.0	Return	36,175	36,175	No. People	137	Runarnd	75.0	68.0	
Opt Vent	0.0	0	0.0	0.0	Exhaust	10,853	0	Htg % OA	0.0	Fn MtrTD	0.5	0.5	
Total	-698.5				Rm Exh	0	0	Htg Cfm/Sqft	0.63	Fn BldTD	0.4	0.4	
					Auxil	0	0	Htg Btuh/Sqft	-12.14	Fn Frict	1.1	1.1	

System 2 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/16 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 * OADB: 91 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	860		860	3.22	*	0	0.00	*	0	-2,559	41.46
Glass Solar	255	0		255	0.96	*	255	1.05	*	0	0	0.00
Glass Cond	162	0		162	0.61	*	162	0.67	*	-766	-766	12.40
Wall Cond	747	183		929	3.48	*	747	3.06	*	-2,286	-2,848	46.14
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	-1,164	1,042		2,206	8.26	*	1,164	4.77	*	-3,052	-6,172	100.00
Internal Loads						*			*			
Lights	19,780	0		19,780	74.09	*	19,780	81.07	*	0	0	0.00
People	4,712			4,712	17.65	*	2,223	9.11	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	24,492	0	0	24,492	91.74	*	22,002	90.18	*	0	0	0.00
Ceiling Load	1,918	-1,918		0	0.00	*	1,233	5.05	*	-3,429	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	27,574	-876	0	26,698	100.00	*	24,399	100.00	*	-6,481	-6,172	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
				Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor		
Main Clg	2.2	26.7	1,450	76.4	62.9	66.5	59.5	56.8	66.4	Part	4,100	
Aux Clg	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0	
Opt Vent	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	580	0 0
Totals	2.2	26.7								Wall	196	21 11

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	--ENGINEERING CHECKS--			--TEMPERATURES (F)---		
								Clg % OA	0.0	Type	Clg	Htg	
Main Htg	-9.0	104	46.3	125.0	Vent	0	0	Clg Cfm/Sqft	0.35	SADB	59.5	125.0	
Aux Htg	0.0	0	0.0	0.0	Infil	0	0	Clg Cfm/Ton	651.78	Plenum	76.5	63.8	
Preheat	-0.0	1,450	64.5	59.5	Supply	1,450	104	Clg Sqft/Ton	1842.83	Return	79.7	64.5	
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	6.51	Ret/OA	76.4	64.5	
Humidif	0.0	0	0.0	0.0	Return	0	104	No. People	10	Runarnd	75.0	68.0	
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0	
Total	-9.0				Rm Exh	17,730	0	Htg Cfm/Sqft	0.03	Fn BldTD	0.0	0.0	
					Auxil	0	0	Htg Btuh/Sqft	-2.18	Fn Frict	0.0	0.0	

System 3 Block INDFP - 4-PIPE INDUCTION

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/20 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 83 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	474	21,484		21,957	1.49	*	740	0.16	*	-1,579	-73,446	4.52
Glass Solar	77,250	0		77,250	5.26	*	70,438	15.09	*	0	0	0.00
Glass Cond	36,551	0		36,551	2.49	*	24,143	5.17	*	-185,619	-185,619	11.43
Wall Cond	113,330	16,902		130,232	8.86	*	172,726	37.00	*	-328,407	-377,319	23.24
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	613,478			613,478	41.75	*	119,432	25.58	*	-987,377	-987,377	60.81
Sub Total==>	841,082	38,386		879,468	59.84	*	387,477	83.00	*	-1,502,981	-1,623,761	100.00
Internal Loads												
Lights	179,324	0		179,324	12.20	*	48,699	10.43	*	0	0	0.00
People	45,248			45,248	3.08	*	5,354	1.15	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	224,572	0	0	224,572	15.28	*	54,053	11.58	*	0	0	0.00
Ceiling Load	14,654	-14,654		0	0.00	*	25,171	5.39	*	-47,811	0	0.00
Outside Air	0	0	0	252,299	17.17	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				110,564	7.52	*		0.00	*		0	0.00
Ret. Fan Heat		13,820		13,820	0.94	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	122			122	0.01	*	122	0.03	*	0	0	0.00
Exhaust Heat		-11,266	0	-11,266	-0.77	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	1,080,430	26,287	0	1,469,580	100.00	*	466,824	100.00	*	-1,550,792	-1,623,761	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor		
Main Clg	45.0	539.6	385.7	19,435	80.9	66.7	78.0	60.4	58.0	70.1	41,364	
Aux Clg	70.5	846.0	530.5	25,306	75.0	64.1	74.4	65.7	52.9	40.9	0	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0	
Totals	115.5	1,385.6									28,354	5,152 18

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	--ENGINEERING CHECKS--			--TEMPERATURES (F)--		
	(Mbh)	(cfm)	Deg F	Deg F				Clg % OA	30.0	Type	Clg	Htg	
Main Htg	-590.3	19,435	64.5	92.4	Vent	5,830	0	Clg Cfm/Sqft	0.47	SADB	65.7	92.4	
Aux Htg	-1,033.5	25,306	68.1	105.6	Infil	14,177	14,177	Clg Cfm/Ton	432.19	Plenum	76.1	64.4	
Preheat	-0.0	19,435	64.5	60.4	Supply	19,435	19,435	Clg Sqft/Ton	919.84	Return	76.8	64.5	
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	13.05	Ret/OA	80.9	64.5	
Humidif	0.0	0	0.0	0.0	Return	19,435	19,435	No. People	98	Runarnd	75.0	68.0	
Opt Vent	0.0	0	0.0	0.0	Exhaust	5,830	0	Htg % OA	0.0	Fn MtrTD	1.3	1.3	
Total	-1,623.8				Rm Exh	0	0	Htg Cfm/Sqft	0.47	Fn BldTD	1.0	1.0	
					Auxil	25,306	25,306	Htg Btuh/Sqft	-14.27	Fn Frict	2.9	2.9	

System 4 Block UH - UNIT HEATERS

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 0/ 0 * Mo/Hr: 0/ 0 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 * OADB: 0 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	*	Space Sensible (Btuh)	Perct Of Tot (%)	*	Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Wall Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Partition	0			0	0.00	*	0	0.00	*	-6,715	-6,715	100.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	0			0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-6,715	-6,715	100.00
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-6,715	-6,715	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR Deg F Deg F Grains	Leaving DB/WB/HR Deg F Deg F Grains	Gross Total	Glass (sf)	(%)
Main Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Floor	2,544	
Aux Clg	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	Part	1,632	
Opt Vent	0.0	0.0	0	0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	0	
Totals	0.0	0.0	0			Roof	0	0 0
						Wall	0	0 0

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
Main Htg	-6.7	1,835	68.0	71.4	Vent	0	0	Clg Cfm/Sqft	0.00	SADB	0.0	71.4
Aux Htg	0.0	0	0.0	0.0	Infil	0	0	Clg Cfm/Ton	0.00	Plenum	0.0	68.0
Preheat	0.0	0	0.0	0.0	Supply	0	1,835	Clg Sqft/Ton	0.00	Return	0.0	68.0
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	68.0
Humidif	0.0	0	0.0	0.0	Return	0	1,835	No. People	0	Runarnd	0.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.0	0.0
Total	-6.7				Rm Exh	0	0	Htg Cfm/Sqft	0.72	Fn BldTD	0.0	0.0
					Auxil	0	0	Htg Btuh/Sqft	-2.64	Fn Frict	0.1	0.0

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 5 Block DD - DOUBLE DUCT

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****

Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct	Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot	Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)	(Btuh)	(Btuh)	(%)
Envelope Loads											
Skylite Solr	0	0		0	0.00		0	0.00	0	0	0.00
Skylite Cond	0	0		0	0.00		0	0.00	0	0	0.00
Roof Cond	14,486	0		14,486	2.29		16,221	8.17	-48,286	-48,286	25.44
Glass Solar	8,014	0		8,014	1.27		7,222	3.64	0	0	0.00
Glass Cond	3,286	0		3,286	0.52		3,509	1.77	-16,588	-16,588	8.74
Wall Cond	4,161	526		4,687	0.74		5,622	2.83	-16,677	-18,921	9.97
Partition	0			0	0.00		0	0.00	0	0	0.00
Exposed Floor	0			0	0.00		0	0.00	0	0	0.00
Infiltration	24,070			24,070	3.81		13,603	6.85	-56,169	-56,169	29.60
Sub Total==>	54,017	526		54,543	8.63		46,176	23.25	-137,719	-139,964	73.75
Internal Loads											
Lights	123,012	0		123,012	19.46		129,725	65.32	0	0	0.00
People	30,203			30,203	4.78		14,612	7.36	0	0	0.00
Misc	0	0	0	0	0.00		0	0.00	0	0	0.00
Sub Total==>	153,215	0	0	153,215	24.24		144,337	72.68	0	0	0.00
Ceiling Load	1,375	-1,375		0	0.00		1,553	0.78	-4,627	0	0.00
Outside Air	0	0	0	249,413	39.46		0	0.00	0	0	0.00
Sup. Fan Heat				158,470	25.07			0.00		0	0.00
Ret. Fan Heat		19,809		19,809	3.13			0.00		0	0.00
Duct Heat Pkup		0		0	0.00			0.00		0	0.00
OV/UNDR Sizing	6,537			6,537	1.03		6,537	3.29	-49,820	-49,820	26.25
Exhaust Heat		-9,934	0	-9,934	-1.57			0.00		0	0.00
Terminal Bypass		0	0	0	-0.00			0.00		0	0.00
Grand Total==>	215,144	9,026	0	632,052	100.00		198,603	100.00	-192,167	-189,784	100.00

-----COOLING COIL SELECTION-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains		
Main Clg	52.7	632.1	496.7	27,856	80.4	69.1	91.7	63.2	62.6	86.1	Floor	27,121
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0
Totals	52.7	632.1									Roof	8,563
											Wall	1,613

-----HEATING COIL SELECTION-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	--ENGINEERING CHECKS--			--TEMPERATURES (F)--		
	(Mbh)	(cfm)	Deg F	Deg F				Clg % OA	30.0	Type	Clg	Htg	
Main Htg	-208.3	27,856	67.5	74.3	Vent	8,357	0	Clg Cfm/Sqft	1.03	SADB	68.4	74.3	
Aux Htg	0.0	0	0.0	0.0	Infil	907	807	Clg Cfm/Ton	528.87	Plenum	75.4	66.5	
Preheat	-448.4	27,856	48.4	63.2	Supply	27,856	27,856	Clg Sqft/Ton	514.91	Return	76.1	67.5	
Reheat	0.0	0	0.0	0.0	MinCFM	0	0	Clg Btuh/Sqft	23.30	Ret/OA	80.4	67.5	
Humidif	0.0	0	0.0	0.0	Return	27,856	27,856	No. People	65	Runarnd	75.0	68.0	
Opt Vent	0.0	0	0.0	0.0	Exhaust	8,357	0	Htg % OA	0.0	Fn MtrTD	1.3	1.3	
Total	-656.7				Rm Exh	0	0	Htg Cfm/SqFt	1.03	Fn BldTD	1.0	1.0	
					Auxil	0	0	Htg Btuh/SqFt	-24.21	Fn Frict	2.9	2.9	

System 6 Block DD - DOUBLE DUCT

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==> Mo/Hr: 7/14 * Mo/Hr: 7/16 * Mo/Hr: 13/ 1
Outside Air ==> OADB/WB/HR: 91/ 74/105.0 * OADB: 91 * OADB: 4

	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)		Space Sensible (Btuh)	Perct Of Tot (%)		Space Peak Space Sens (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	14,486	0		14,486	2.29	*	16,221	8.17	*	-48,286	-48,286	25.44
Glass Solar	8,014	0		8,014	1.27	*	7,222	3.64	*	0	0	0.00
Glass Cond	3,286	0		3,286	0.52	*	3,509	1.77	*	-16,588	-16,588	8.74
Wall Cond	4,161	526		4,687	0.74	*	5,622	2.83	*	-16,677	-18,921	9.97
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.00
Infiltration	24,070			24,070	3.81	*	13,603	6.85	*	-56,169	-56,169	29.60
Sub Total==>	54,017	526		54,543	8.63	*	46,176	23.25	*	-137,719	-139,964	73.75
Internal Loads												
Lights	123,012	0		123,012	19.46	*	129,725	65.32	*	0	0	0.00
People	30,203			30,203	4.78	*	14,612	7.36	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	153,215	0	0	153,215	24.24	*	144,337	72.68	*	0	0	0.00
Ceiling Load	1,375	-1,375		0	0.00	*	1,553	0.78	*	-4,627	0	0.00
Outside Air	0	0	0	249,413	39.46	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				158,470	25.07	*		0.00	*		0	0.00
Ret. Fan Heat		19,809		19,809	3.13	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	6,537			6,537	1.03	*	6,537	3.29	*	-49,820	-49,820	26.25
Exhaust Heat		-9,934	0	-9,934	-1.57	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	-0.00	*		0.00	*		0	0.00
Grand Total==>	215,144	9,026	0	632,052	100.00	*	198,603	100.00	*	-192,167	-189,784	100.00

-----COOLING COIL SELECTION-----

	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
				Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor		
Main Clg	52.7	632.1	496.7	80.4	69.1	91.7	63.2	62.6	86.1	27,121		
Aux Clg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Part	0	
Opt Vent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	0	
Totals	52.7	632.1								Roof	8,563	0 0
										Wall	1,613	460 29

-----HEATING COIL SELECTION-----

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	--ENGINEERING CHECKS--			--TEMPERATURES (F)---		
								Clg % OA	30.0		Type	Clg	Htg
Main Htg	-208.3	27,856	67.5	74.3	Vent	8,357	0	Clg Cfm/Sqft	1.03		SADB	68.4	74.3
Aux Htg	0.0	0	0.0	0.0	Infil	807	807	Clg Cfm/Ton	528.87		Plenum	75.4	66.5
Preheat	-448.4	27,856	48.4	63.2	Supply	27,856	27,856	Clg Sqft/Ton	514.91		Return	76.1	67.5
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	23.30		Ret/OA	80.4	67.5
Humidif	0.0	0	0.0	0.0	Return	27,856	27,856	No. People	65		Runarnd	75.0	68.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	8,357	0	Htg % OA	0.0		Fn MtrTD	1.3	1.3
Total	-656.7				Rm Exh	0	0	Htg Cfm/Sqft	1.03		Fn BldTD	1.0	1.0
					Auxil	0	0	Htg Btuh/Sqft	-24.21		Fn Frict	2.9	2.9

BUILDING U-VALUES - ALTERNATIVE 1
COMBINED ECOS

----- B U I L D I N G U - V A L U E S -----												
Room Number	Description	Part.	ExFlr	Room U-Values (Btu/hr/sqft/F)							Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
				Summr Skylt	Wintr Skylt	Summr Roof	Wintr Windo	Windo	Wall	Ceil.		
1	SUB BSMT, BSMT W	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
Zone	1 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.8	9.61
4	BSMT E	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
Zone	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	45.2	9.27
System	1 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	46.4	9.54
2	TOILETS, KITCHEN	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	29.4	5.93
Zone	2 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	29.4	5.93
11	TOILETS W ROOF	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
Zone	11 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.000	0.000	0.000	0.317	71.1	15.13
System	2 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.317	35.3	7.23
3	STAIRS	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.229	0.000	103.3	21.63
Zone	3 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.229	0.000	103.3	21.63
5	1ST FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	57.9	12.05
Zone	5 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	57.9	12.05
7	2ND FL OFFICES	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	56.7	11.81
Zone	7 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	56.7	11.81
9	3RD FL OFFICES	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.317	102.3	21.84
Zone	9 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.317	102.3	21.84
12	STAIRS W ROOF	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.229	0.000	146.4	31.13
Zone	12 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.229	0.000	146.4	31.13
System	3 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.256	0.317	74.1	15.63
13	SUPPLY STORAGE	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
Zone	13 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
System	4 Total/Ave.	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.7	14.70
6	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	32.5	6.60
Zone	6 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	32.5	6.60
8	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.000	27.0	5.41
Zone	8 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.000	27.0	5.41
10	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.000	71.5	15.21
Zone	10 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.000	71.5	15.21
System	5 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.317	43.1	8.94
14	1ST FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	32.5	6.60
Zone	14 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.317	32.5	6.60
15	2ND FL CEN OFFCS	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.000	27.0	5.41
Zone	15 Total/Ave.	0.000	0.000	0.000	0.000	0.000	0.550	0.563	0.257	0.000	27.0	5.41
16	3RD FL CEN OFFCS	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.000	71.5	15.21
Zone	16 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.000	71.5	15.21
System	6 Total/Ave.	0.000	0.000	0.000	0.000	0.088	0.550	0.563	0.257	0.317	43.1	8.94
Building		0.229	0.000	0.000	0.000	0.088	0.550	0.563	0.256	0.317	52.6	10.93

BUILDING AREAS - ALTERNATIVE 1
COMBINED ECOS

BUILDING AREAS

Room Number	Description	Number of Duplicate Flr Rm	Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Skl /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
1	SUB BSMT, BSMT W	1	1	45,125	45,125	13,222	0	0	0	0	0	0
Zone	1 Total/Ave.			45,125	13,222	0	0	0	0	0	0	0
4	BSMT E	1	1	12,424	12,424	3,348	0	0	0	0	0	0
Zone	4 Total/Ave.			12,424	3,348	0	0	0	0	0	0	0
System	1 Total/Ave.			57,549	16,570	0	0	0	0	0	0	0
2	TOILETS, KITCHEN	1	1	3,520	3,520	0	0	0	0	21	11	174
Zone	2 Total/Ave.			3,520	0	0	0	0	0	21	11	174
11	TOILETS W ROOF	1	1	580	580	0	0	0	580	0	0	0
Zone	11 Total/Ave.			580	0	0	0	0	580	0	0	0
System	2 Total/Ave.			4,100	0	0	0	0	580	21	11	174
3	STAIRS	1	1	560	560	0	0	0	0	255	29	625
Zone	3 Total/Ave.			560	0	0	0	0	0	255	29	625
5	1ST FL OFFICES	1	1	11,724	11,724	0	0	0	0	1,573	19	6,530
Zone	5 Total/Ave.			11,724	0	0	0	0	0	1,573	19	6,530
7	2ND FL OFFICES	1	1	14,400	14,400	0	0	0	0	1,610	17	7,730
Zone	7 Total/Ave.			14,400	0	0	0	0	0	1,610	17	7,730
9	3RD FL OFFICES	1	1	14,400	14,400	0	0	0	14,400	1,610	17	8,010
Zone	9 Total/Ave.			14,400	0	0	0	0	14,400	1,610	17	8,010
12	STAIRS W ROOF	1	1	280	280	0	0	0	280	105	25	307
Zone	12 Total/Ave.			280	0	0	0	0	280	105	25	307
System	3 Total/Ave.			41,364	0	0	0	0	14,680	5,152	18	23,202
13	SUPPLY STORAGE	1	1	2,544	2,544	1,632	0	0	0	0	0	0
Zone	13 Total/Ave.			2,544	1,632	0	0	0	0	0	0	0
System	4 Total/Ave.			2,544	1,632	0	0	0	0	0	0	0
6	1ST FL CEN OFFCS	1	1	9,884	9,884	0	0	0	0	250	19	1,038
Zone	6 Total/Ave.			9,884	0	0	0	0	0	250	19	1,038
8	2ND FL CEN OFFCS	1	1	8,674	8,674	0	0	0	0	105	66	55
Zone	8 Total/Ave.			8,674	0	0	0	0	0	105	66	55
10	3RD FL CEN OFFCS	1	1	8,563	8,563	0	0	0	8,563	105	64	60
Zone	10 Total/Ave.			8,563	0	0	0	0	8,563	105	64	60
System	5 Total/Ave.			27,121	0	0	0	0	8,563	460	29	1,153
14	1ST FL CEN OFFCS	1	1	9,884	9,884	0	0	0	0	250	19	1,038
Zone	14 Total/Ave.			9,884	0	0	0	0	0	250	19	1,038
15	2ND FL CEN OFFCS	1	1	8,674	8,674	0	0	0	0	105	66	55
Zone	15 Total/Ave.			8,674	0	0	0	0	0	105	66	55
16	3RD FL CEN OFFCS	1	1	8,563	8,563	0	0	0	8,563	105	64	60
Zone	16 Total/Ave.			8,563	0	0	0	0	8,563	105	64	60
System	6 Total/Ave.			27,121	0	0	0	0	8,563	460	29	1,153
Building				159,799	18,202	0	0	0	32,386	6,095	19	25,681

ASHRAE 90 ANALYSIS - ALTERNATIVE 1
COMBINED ECOS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.088 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.313 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.199 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.96 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTVw) = 15.07 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1
COMBINED ECOS

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	14.4	0	0	-182,567	13	173	5,730.4	0	0	0.0	0	0
5 - 10	28.7	1	12	-365,133	6	78	11,460.7	0	0	0.0	0	0
10 - 15	43.1	7	70	-547,700	6	78	17,191.1	0	0	0.0	0	0
15 - 20	57.5	9	98	-730,267	4	59	22,921.4	0	0	0.0	0	0
20 - 25	71.8	7	72	-912,833	4	48	28,651.8	0	0	0.0	0	0
25 - 30	86.2	9	93	-1,095,400	7	94	34,382.1	0	0	0.0	0	0
30 - 35	100.5	21	226	-1,277,966	10	139	40,112.5	0	0	0.0	0	0
35 - 40	114.9	9	100	-1,460,533	11	147	45,842.8	0	0	0.0	0	0
40 - 45	129.3	8	86	-1,643,100	40	541	51,573.2	0	0	0.0	0	0
45 - 50	143.6	5	49	-1,825,667	0	0	57,303.6	0	0	0.0	0	0
50 - 55	158.0	4	45	-2,008,233	0	0	63,033.9	0	0	0.0	0	0
55 - 60	172.4	2	19	-2,190,800	0	0	68,764.3	0	0	0.0	0	0
60 - 65	186.7	7	70	-2,373,366	0	0	74,494.6	0	0	0.0	0	0
65 - 70	201.1	6	60	-2,555,933	0	0	80,225.0	0	0	0.0	0	0
70 - 75	215.4	6	60	-2,738,500	0	0	85,955.3	0	0	0.0	0	0
75 - 80	229.8	0	5	-2,921,067	0	0	91,685.7	0	0	0.0	0	0
80 - 85	244.2	0	5	-3,103,633	0	0	97,416.0	0	0	0.0	0	0
85 - 90	258.5	0	0	-3,286,200	0	0	103,146.4	0	0	0.0	0	0
90 - 95	272.9	0	0	-3,468,767	0	0	108,876.8	0	0	0.0	0	0
95 - 100	287.3	0	0	-3,651,333	0	0	114,607.1	100	2,520	0.0	0	0
Hours Off	0.0	0	7,690	0	0	7,403	0.0	0	6,240	0.0	0	8,760

BUILDING TEMPERATURE PROFILES

[illegible]

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1
COMBINED ECOS

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	STEAM	STEAM DMND	
	Off Peak (kWh)	On Peak (kW)	On Peak (Therm)	WATER (1000 G1)	On Peak (Thrm/hr)
Jan	135,416	667	11,246	0	55
Feb	122,519	667	10,411	0	55
March	148,313	667	9,724	0	55
April	123,931	667	2,842	0	43
May	160,025	778	0	57	0
June	164,813	823	0	91	0
July	161,875	874	0	149	0
Aug	173,409	834	0	101	0
Sept	145,893	794	0	55	0
Oct	134,870	667	1,822	0	40
Nov	127,109	667	4,967	0	52
Dec	128,968	667	9,808	0	55
Total	1,727,141	874	50,822	454	55

Building Energy Consumption = 68,692 (Btu/Sq Ft/Year)
Source Energy Consumption = 153,081 (Btu/Sq Ft/Year)

Floor Area = 159,799 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION

Ref Num	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	50971	46117	55825	48544	53398	53398	48544	55825	48544	53398	48544	48544	611,651
	PK	265.3	265.3	265.3	265.3	265.3	265.3	265.3	265.3	265.3	265.3	265.3	265.3	265.3
1	MISC LD													
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTW20	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1001S		2-STG CTV <555 TONS											
	ELEC	0	0	0	0	11882	16670	27199	18532	11218	0	0	0	85,501
	PK	0.0	0.0	0.0	0.0	81.7	127.2	177.8	137.7	98.3	0.0	0.0	0.0	177.8
1	EQ5100		COOLING TOWER											
	ELEC	0	0	0	0	5115	5115	4650	5348	4650	0	0	0	24,878
	PK	0.0	0.0	0.0	0.0	23.3	23.3	23.3	23.3	23.3	0.0	0.0	0.0	23.3
1	EQ5100		COOLING TOWER											
	WATER	0	0	0	0	57	91	149	101	55	0	0	0	454
	PK	0.0	0.0	0.0	0.0	0.4	0.7	0.9	0.8	0.6	0.0	0.0	0.0	0.9
1	EQ5001		CHILLED WATER PUMP C.V.											
	ELEC	0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
	PK	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5010		CONDENSER WATER PUMP C.V.											
	ELEC	0	0	0	0	6562	6562	5966	6860	5966	0	0	0	31,916
	PK	0.0	0.0	0.0	0.0	29.8	29.8	29.8	29.8	29.8	0.0	0.0	0.0	29.8
1	EQ5300		CONTROL PANEL & INTERLOCK											

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1
COMBINED ECOS[illegible]

[illegible]

UTILITY PEAK CHECKSUMS - ALTERNATIVE 1
COMBINED ECOS

----- UTILITY PEAK CHECKSUMS -----

Utility ELECTRIC DEMAND

Peak Value 873.7 (kW)
Yearly Time of Peak 14 (hr) 7 (mo)

Hour 14 Month 7

Eqp. Ref. Num.	Equipment Code Name	Equipment Description	Utility Demand (kW)	Perct Of Tot (%)
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Cooling Equipment

1	EQ1001S	2-STG CTV <555 TONS	261.7	29.95
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Sub Total			261.7	29.95
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Sub Total			0.0	0.00
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Air Moving Equipment

1		SUMMATION OF FAN ELECTRICAL DEMAND	57.3	6.56
3		SUMMATION OF FAN ELECTRICAL DEMAND	74.9	8.57
5		SUMMATION OF FAN ELECTRICAL DEMAND	107.3	12.28
6		SUMMATION OF FAN ELECTRICAL DEMAND	107.3	12.28

Sub Total			346.8	39.69
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Sub Total			0.0	0.00
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Miscellaneous

Lights			265.3	30.36
Base Utilities			0.0	0.00
Misc Equipment			0.0	0.00
Sub Total			265.3	30.36

Grand Total			873.7	100.00
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